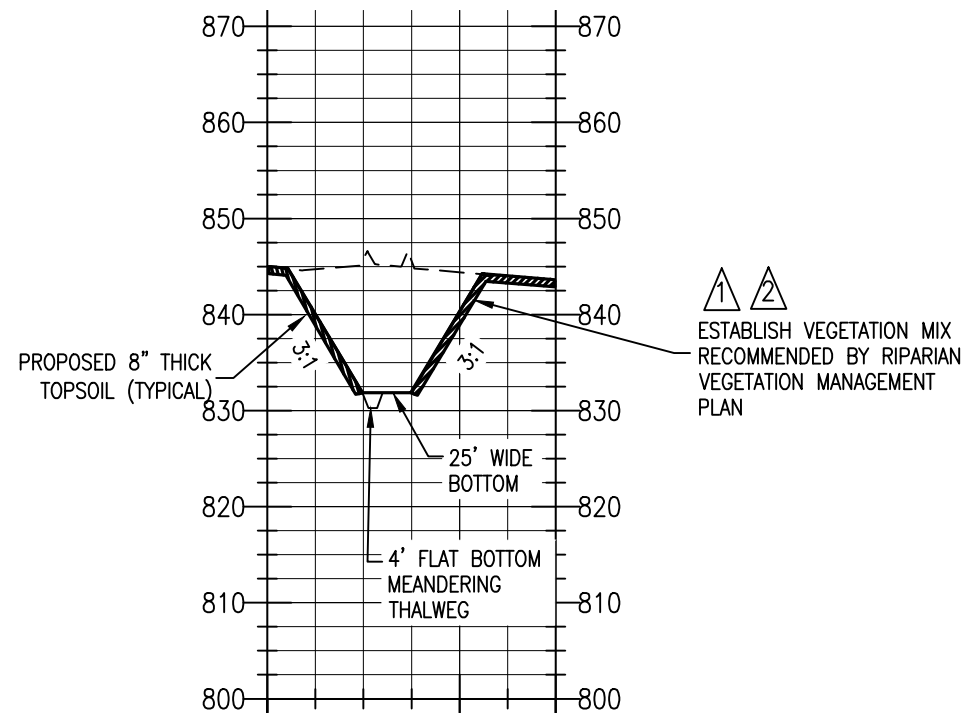
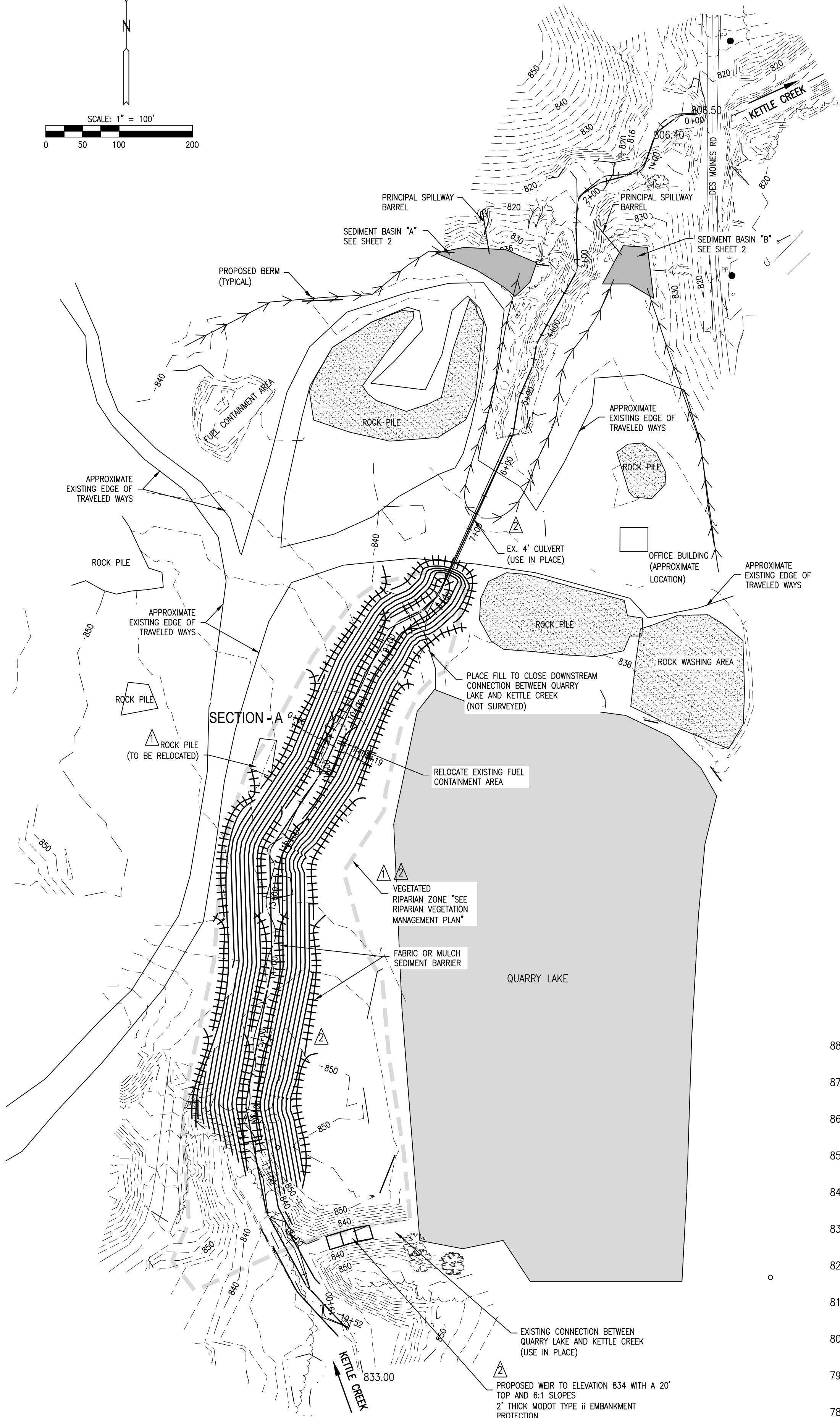
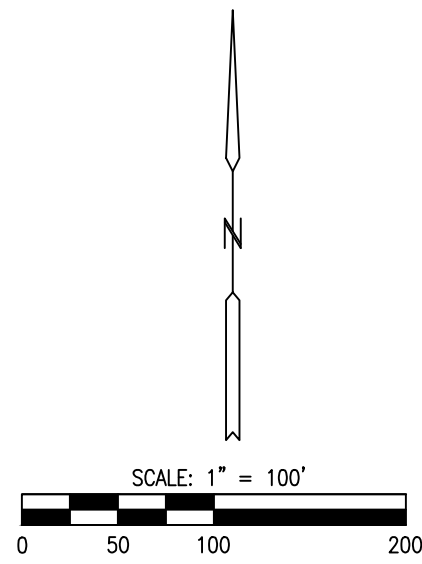


**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF MISSOURI  
ST. JOSEPH DIVISION**

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Case No. 20-6060-CV-FJG
	)	
TRAGER LIMESTONE LLC,	)	
	)	
Defendant.	)	
	)	

**APPENDIX A TO THE CONSENT DECREE**

# Attachment 1, Sealed Construction Plans



## SECTION - A



### GENERAL NOTES:

1. THERE ARE TWO STORM WATER POLLUTION PREVENTION PLANS (SWPPPs) IN EFFECT ON THE QUARRY SITE. BOTH SWPPPs ARE TO BE MAINTAINED DURING CONSTRUCTION OF THE STREAM RESTORATION.
2. THE GENERAL SITE SWPPP WHICH COVERS ROUTINE QUARRY OPERATIONS.
3. THE STREAM RESTORATION PROJECT SWPPP WHICH COVERS THE COMPONENTS OF THIS STREAM RESTORATION PROJECT.
4. WATER FOR PLANTS AND DUST SUPPRESSION SHALL BE TAKEN FROM QUARRY LAKE.
5. FILL TO CLOSE DOWNSTREAM CONNECTION BETWEEN QUARRY LAKE AND KETTLE CREEK SHOULD BE MATERIALS EXCAVATED FROM THE STREAM RESTORATION, BUT MUST BE TOPPED WITH 8" OF TOPSOIL AND INCLUDED IN TEMPORARY SEEDING AND RIPARIAN VEGETATED MANAGEMENT PLAN.
6. THE WEIR BETWEEN KETTLE CREEK AND QUARRY LAKE SHOULD BE LINED WITH 2' OF MDOT TYPE 2 EMBANKMENT PROTECTION PER MDOT STANDARD SPECIFICATIONS.

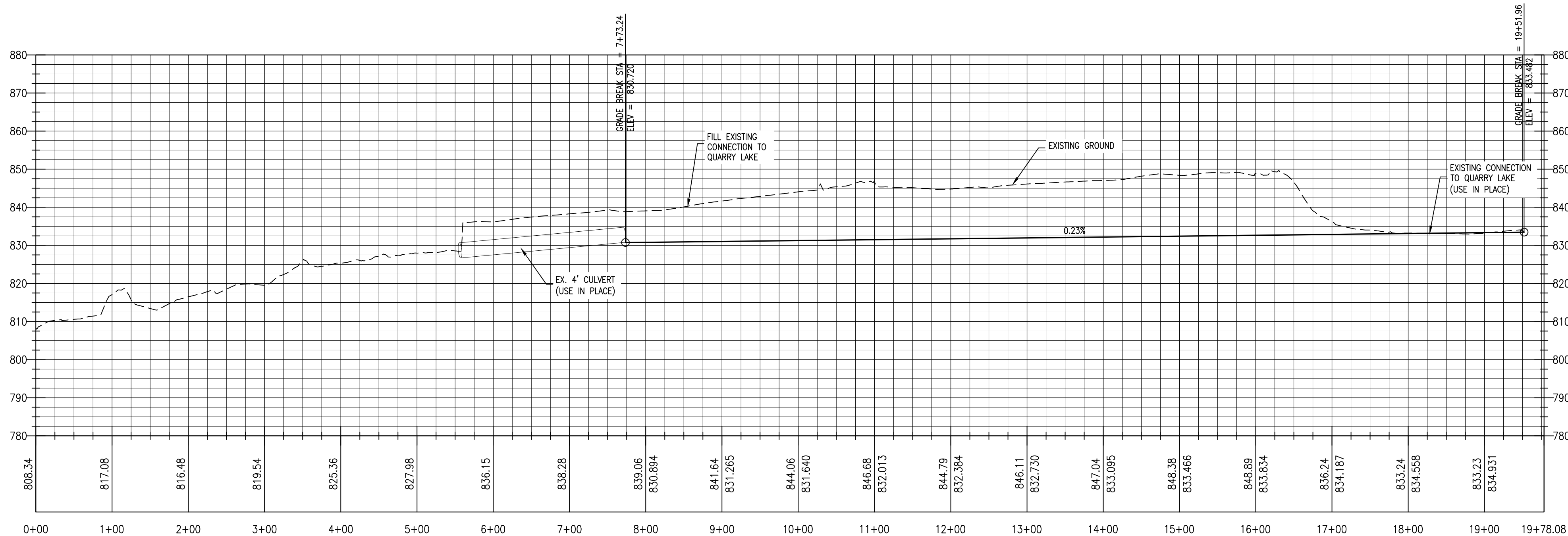
### CONSTRUCTION SEQUENCING:

STEPS 1- 8 ARE TO BE COMPLETED BY AUGUST 1, 2022.

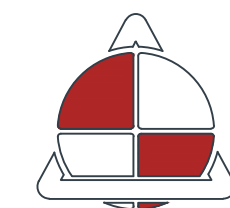
1. CONSTRUCT SEDIMENT BASINS A AND B AND THEIR ASSOCIATED BERMS PRIOR TO CONSTRUCTION OF THE STREAM RESTORATION.
2. EXCAVATE 25' WIDE TRAPEZOIDAL RESTORATION CHANNEL TO 8" BELOW FINISHED GRADE SHOWN ON PLANS USING EXCAVATORS, BULLDOZERS, SKIDSTEERS, ROAD GRADERS OR OTHER SUITABLE EQUIPMENT. EXCAVATED MATERIAL SHALL BE HAULED TO A LOCATION ON SITE AND STOCKPILED, RECYCLED OR USED IN ACCORDANCE WITH THE SITE SWPPP. EROSION CONTROL SHALL BE PROVIDED FOR STOCKPILED MATERIALS AS DIRECTED IN THE SITE SWPPP TO PREVENT SEDIMENT LADEN DRAINAGE INTO THE WATERS OF THE UNITED STATES.
3. SMOOTH THE 3:1 EXCAVATED CHANNEL WALLS TO 8" BELOW FINISHED GRADE TO PRODUCE A CONSISTENT FINISHED GRADE WITH SLOPES NO STEEPER THAN 3:1 USING EXCAVATORS, BULLDOZERS, SKIDSTEERS, ROAD GRADERS OR OTHER SUITABLE EQUIPMENT.
4. USING AN EXCAVATOR, EXCAVATE THE 4' WIDE MEANDERING THALWEG TO DIMENSIONS, PLATFORM AND FINISHED GRADE SHOWN ON PLANS.
5. CONSTRUCT WEIR BETWEEN KETTLE CREEK AND UPSTREAM CONNECTION TO QUARRY LAKE.
6. PLACE FILL TO CLOSE DOWNSTREAM CONNECTION BETWEEN QUARRY LAKE AND KETTLE CREEK.
7. PLACE 8" OF TOP SOIL ON THE 3:1 SIDE SLOPES AND THE VEGETATED RIPARIAN ZONE. TOPSOIL IS NOT NECESSARY FOR THE CHANNEL BOTTOM OR MEANDERING THALWEG.
8. IMPLEMENT TEMPORARY SEEDING, FERTILIZER AND MULCH OVER VEGETATED RIPARIAN ZONE EXCEPT UNDISTURBED VEGETATED AREAS THAT ARE ALREADY ADEQUATELY (70%) VEGETATED.
9. IMPLEMENT THE RIPARIAN VEGETATION MANAGEMENT PLAN OVER THE ENTIRE VEGETATED RIPARIAN ZONE WITH THE EXCEPTION OF THE MEANDERING THALWEG.

### TEMPORARY SEEDING, FERTILIZER AND MULCH

1. SEE PROJECT SWPPP FOR TEMPORARY SEEDING SPECIFICATIONS



KETTLE CREEK  
DRAINAGE AREA = 1.68 SQ. MI.  
Q<sub>2</sub> = 445 CFS  
Q<sub>10</sub> = 1,100 CFS  
Q<sub>100</sub> = 2,090 CFS

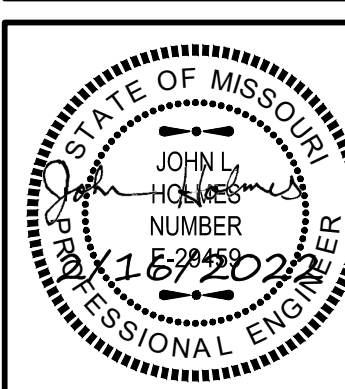


**ALLSTATE  
CONSULTANTS**  
3312 LEMONE INDUSTRIAL BLVD.  
COLUMBIA, MO 65201  
(573) 875-8799  
allstateconsultants.net

MISSOURI STATE CERTIFICATE  
OF AUTHORITY #2007004004

REUSE OF THIS DRAWING IN ANY MANNER IS  
STRICTLY PROHIBITED WITHOUT THE WRITTEN  
APPROVAL OF  
ALLSTATE CONSULTANTS, LLC

## PROPOSED KETTLE CREEK RESTORATION TRAGER QUARRY-NETTLETON CALDWELL COUNTY, MISSOURI



### DATE

9-29-2021

### REVISED:

- 12-14-2021
- 02-16-2022

### JOB NUMBER

20223.01

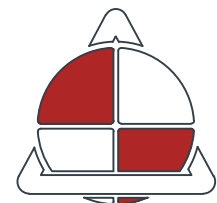
### SCALE

1"=100' H 1"=10' V

### SHEET

1



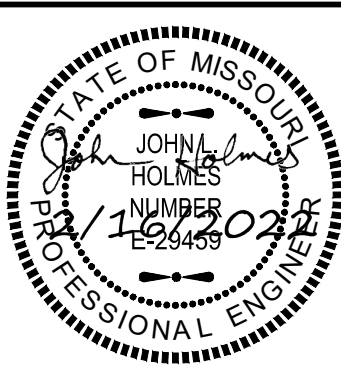


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PROPOSED KETTLE CREEK RESTORATION  
TRAGER QUARRY-NETTLETON  
CALDWELL COUNTY, MISSOURI



DATE

9-29-2021

REVISED:

02-16-2022

JOB NUMBER

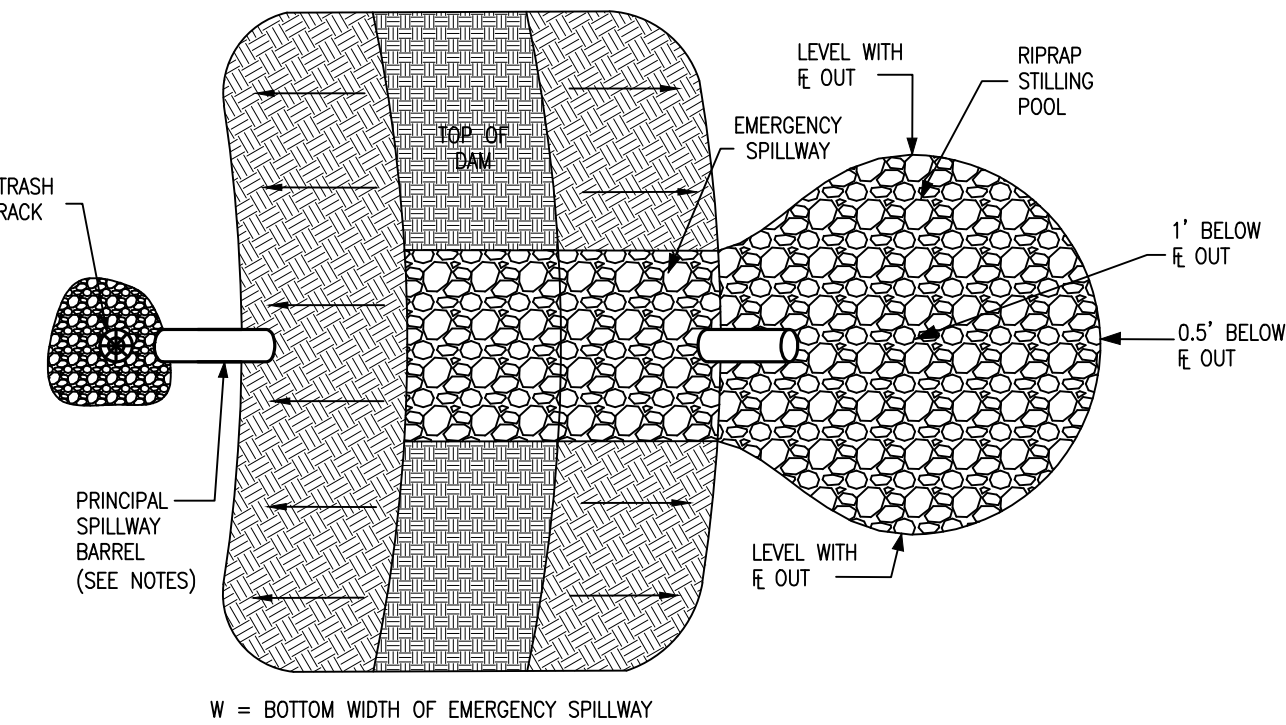
20223.01

SCALE

N.T.S.

SHEET

2



NOTES

- PERFORATED RISER - THE SEDIMENT BASIN POOL SHALL BE DRAINED BY USING A PERFORATED RISER OR BY SOME OTHER APPROVED MEANS. TO IMPROVE THE EFFICIENCY OF THE PRINCIPAL SPILLWAY SYSTEM, MAKE THE DIAMETER OF THE RISER AT LEAST 1.25 TIMES THAT OF THE BARREL. THE RISER SHALL BE PERFORATED WITH 1/2" - INCH DIAMETER HOLES SPACED 8 INCHES VERTICALLY AND 10-12 INCHES HORIZONTALLY. COVER THE PERFORATED SECTION OF THE RISER WITH 2 FEET OF 1/2" - 3/4" INCH CLEAN GRAVEL.
- ANTI-VORTEX DEVICE AND TRASH RACK - AN ANTI-VORTEX DEVICE AND TRASH RACK SHALL BE SECURELY INSTALLED ON TOP OF THE RISER. AN APPROVED ANTI-VORTEX DEVICE IS A RIGID VERTICAL PLATE FIRMLY ATTACHED TO THE PIPE AND ORIENTED NORMAL TO THE CENTERLINE OF DAM. THE PLATE DIMENSIONS SHALL BE: LENGTH = DIAMETER OF THE RISER PLUS 12 INCHES; HEIGHT = DIAMETER OF THE BARREL. ANOTHER APPROVED DEVICE IS THE CONCENTRIC COVER TRASH RACK WHICH ALSO FUNCTIONS AS AN ANTI-VORTEX DEVICE.
- BASE - THE BOTTOM OF THE RISER SHALL BE LOCATED AT THE LOW POINT IN THE BASIN TO INSURE COMPLETE DRAINAGE. THE RISER SHALL HAVE A BASE ATTACHED WITH A WATERTIGHT CONNECTION AND SHALL HAVE SUFFICIENT WEIGHT TO PREVENT FLotation OF THE RISER. TWO APPROVED BASES ARE: (1) A CONCRETE BASE 18" THICK WITH THE RISER IMBEDDED 6" IN THE BASE; (2) A 3/4" MINIMUM THICKNESS STEEL PLATE WITH CONTINUOUS WELD ALL AROUND THE BASE OF THE RISER TO FORM A WATERTIGHT CONNECTION. THE PLATE SHALL HAVE 2 FEET OF STONE, GRAVEL, OR TAMPED EARTH PLACED ON IT TO PREVENT FLotation. IN EITHER CASE, EACH SIDE OF THE SQUARE BASE SHALL BE TWICE THE RISER DIAMETER.
- ANTI-SEEP COLLARS - ANTI-SEEP COLLARS SHALL BE INSTALLED AROUND THE PIPE CONDUIT WITHIN THE NORMAL SATURATION ZONE TO INCREASE THE SEEPAGE LENGTH.  
  
THE ANTI-SEEP COLLAR AND ITS CONNECTION TO THE PIPE SHALL BE WATERTIGHT. THE MAXIMUM SPACING SHALL BE APPROXIMATELY 14 TIMES THE MINIMUM PROJECTION OF THE COLLAR MEASURED PERPENDICULAR TO THE PIPE.
- OUTLET PROTECTION - PROTECTION AGAINST SCOUR AT THE DISCHARGE END OF THE PIPE SPILLWAY SHALL BE PROVIDED.

SEDIMENT BASIN

N.T.S.

SEDIMENT BASIN CONSTRUCTION SPECIFICATIONS

- SITE PREPARATIONS - CLEAR, GRUB, AND STRIP TOPSOIL FROM AREAS UNDER THE EMBANKMENT TO REMOVE TREES, VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL. TO FACILITATE SEDIMENT CLEANSOUT AND RESTORATION, CLEAR THE POOL AREA OF ALL BRUSH, TREES, AND OTHER OBJECTIONABLE MATERIALS. STOCKPILE ALL TOPSOIL OR SOIL CONTAINING ORGANIC MATTER FOR USE ON THE OUTER SHELL OF THE EMBANKMENT TO FACILITATE VEGETATIVE ESTABLISHMENT. PLACE TEMPORARY SEDIMENT CONTROL MEASURES BELOW THE BASIN AS NEEDED.
- CUT-OFF TRENCH - EXCAVATE A CUT-OFF TRENCH ALONG THE CENTERLINE OF THE EARTH FILL EMBANKMENT. CUT THE TRENCH TO STABLE SOIL MATERIAL, BUT IN NO CASE MAKE IT LESS THAN 2 FEET DEEP. THE CUT-OFF TRENCH MUST EXTEND INTO BOTH ABUTMENTS TO AT LEAST THE ELEVATION OF THE RISER CREST. MAKE THE MINIMUM BOTTOM WIDTH WIDE ENOUGH TO PERMIT OPERATION OF EXCAVATION AND COMPACTION EQUIPMENT BUT IN NO CASE LESS THAN 2 FEET. MAKE SIDE SLOPES OF THE TRENCH NO STEEPER THAN 1:1. COMPACTION REQUIREMENTS ARE THE SAME AS THOSE FOR THE EMBANKMENT. KEEP THE TRENCH DRY DURING BACKFILLING AND COMPACTION OPERATIONS.
- EMBANKMENT - FILL SHOULD BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, ROCKS, AND OTHER OBJECTIONABLE MATERIAL. SCARIFY AREAS ON WHICH FILL IS TO BE PLACED BEFORE PLACING FILL. THE FILL MATERIAL MUST CONTAIN SUFFICIENT MOISTURE SO IT CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN 6 TO 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL AREA AND THEN COMPACT IT. COMPACTION MAY BE OBTAINED BY ROUTING THE CONSTRUCTION HAULING EQUIPMENT OVER THE FILL SO THAT THE ENTIRE SURFACE OF EACH LAYER IS TRAVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE HEAVY EQUIPMENT, OR A COMPACTOR MAY BE USED. CONSTRUCT THE EMBANKMENT TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLING.
- CONDUIT SPILLWAYS - SECURELY ATTACH THE RISER TO THE BARREL OR BARREL STUB TO MAKE A WATERTIGHT STRUCTURAL CONNECTION. SECURE ALL CONNECTIONS BETWEEN BARREL SECTIONS BY APPROVED WATERTIGHT ASSEMBLIES. PLACE THE BARREL AND RISER ON A FIRM, SMOOTH FOUNDATION OF IMPERVIOUS SOIL. DO NOT USE PERVIOUS MATERIAL SUCH AS SAND, GRAVEL, OR CRUSHED STONE AS BACKFILL AROUND THE PIPE OR ANTI-SEEP COLLARS. PLACE THE FILL MATERIAL AROUND THE PIPE SPILLWAY IN 4-INCH LAYERS AND COMPACT IT UNDER AND AROUND THE PIPE TO AT LEAST THE SAME DENSITY AS THE ADJACENT EMBANKMENT. CARE MUST BE TAKEN NOT TO RAISE THE PIPE FROM FIRM CONTACT WITH ITS FOUNDATION WHEN COMPACTING UNDER THE PIPE HAUNCHES.  
  
PLACE A MINIMUM DEPTH OF 2 FEET OF HAND-COMPACTED BACKFILL OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT. ANCHOR THE RISER IN PLACE BY CONCRETE OR OTHER SATISFACTORY MEANS TO PREVENT FLotation. IN NO CASE SHOULD THE PIPE CONDUIT BE INSTALLED BY CUTTING A TRENCH THROUGH THE DAM AFTER THE EMBANKMENT IS COMPLETE.
- INLETS - DISCHARGE WATER INTO THE BASIN IN A MANNER TO PREVENT EROSION. USE DIVERSIONS WITH OUTLET PROTECTION TO DIVERT SEDIMENT-LADEN WATER TO THE UPPER END OF THE POOL AREA TO IMPROVE BASIN TRAP EFFICIENCY.
- EROSION CONTROL - CONSTRUCT THE STRUCTURE SO THAT THE DISTURBED AREA IS MINIMIZED. DIVERT SURFACE WATER AWAY FROM BARE AREAS. COMPLETE THE EMBANKMENT BEFORE THE AREA IS CLEARED. STABILIZE THE EMERGENCY SPILLWAY EMBANKMENT AND ALL OTHER DISTURBED AREAS ABOVE THE CREST OF THE PRINCIPAL SPILLWAY IMMEDIATELY AFTER CONSTRUCTION.

EROSION CONTROL NOTES

- DENOTES FABRIC OR MULCH SEDIMENT BARRIER.
- >----- DENOTES DIVERSION BERM AND DIRECTION OF FLOW.
- NATURAL GROUND COVER WILL BE MAINTAINED WHERE POSSIBLE.
- EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL A NEW STORMWATER PLAN IS IMPLEMENTED.
- EROSION CONTROL STRUCTURES SHOULD BE FIELD MODIFIED TO ACCOMPLISH DESIRED RESULTS.
- THIS PLAN SHALL BE AMENDED AND UPDATED AS APPROPRIATE, AT A MINIMUM, WHENEVER THE: 1) DESIGN, OPERATIONS, OR MAINTENANCE OF BMP'S IS CHANGED; 2) OPERATION OF THE QUARRY IS CHANGED AND SIGNIFICANTLY AFFECTS THE QUALITY OF THE STORM WATER DISCHARGES; 3) PERMITTEE'S INSPECTIONS INDICATE DEFICIENCIES IN THE PLAN OR ANY BMP'S; AND/OR 4) THE MISSOURI DEPARTMENT OF NATURAL RESOURCES NOTIFIES THE PERMITTEE OF DEFICIENCIES IN THIS PLAN.
- BERMS, SEDIMENT BARRIERS AND SEDIMENT BASINS SHALL BE INSPECTED ON A REGULAR SCHEDULE AND WITHIN A REASONABLE TIME PERIOD (NOT TO EXCEED 48 HOURS) FOLLOWING HEAVY RAINS. REGULAR SCHEDULED INSPECTIONS SHALL BE AT A MINIMUM OF ONCE PER WEEK. ANY DEFICIENCIES SHALL BE NOTED IN A WEEKLY REPORT OF THE INSPECTION AND CORRECTED WITHIN SEVEN CALENDAR DAYS OF THE REPORT.
- SEE SWPPP FOR ADDITIONAL DETAIL

ENVIRONMENTAL STATEMENTS

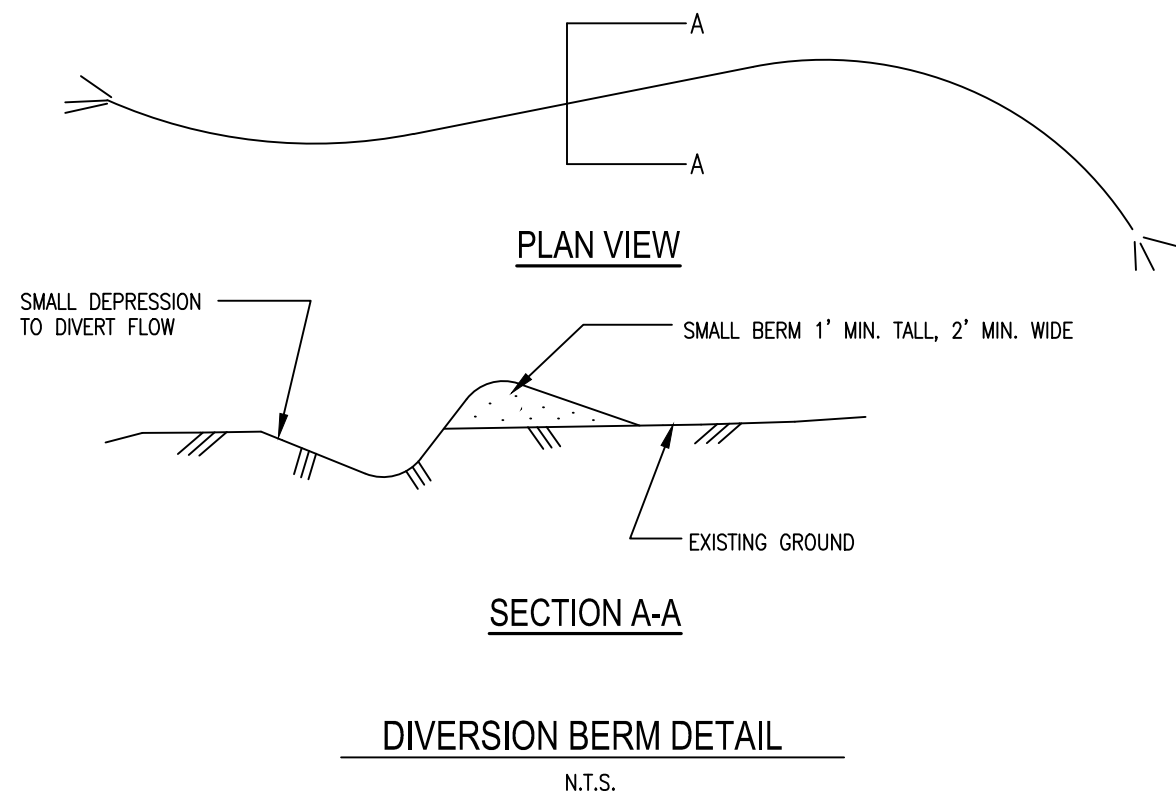
- SUBSTANCES REGULATED BY FEDERAL LAW UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) OR THE COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA) WHICH ARE TRANSPORTED, STORED OR USED FOR MAINTENANCE, CLEANING OR REPAIRS SHALL BE MANAGED ACCORDING TO THE PROVISIONS OF RCRA AND CERCLA.
- ALL PAINTS, SOLVENTS, PETROLEUM PRODUCTS AND PETROLEUM WASTE PRODUCTS (EXCEPT FUELS) AND STORAGE CONTAINERS (SUCH AS DRUMS, CANS OR CARTONS) SHALL BE STORED SUCH THAT THESE MATERIALS ARE NOT EXPOSED TO STORM WATER. SUFFICIENT PRACTICES OF SPILL PREVENTION, CONTROL AND/OR MANAGEMENT SHALL BE PROVIDED TO PREVENT ANY SPILLS OF THESE POLLUTANTS FROM ENTERING A WATER OF THE STATE. ANY CONTAMINANT SYSTEM USED TO IMPLEMENT THIS REQUIREMENT SHALL BE CONSTRUCTED OF MATERIALS COMPATIBLE WITH THE SUBSTANCES CONTAINED AND SHALL ALSO PREVENT THE CONTAMINATION OF GROUNDWATER.
- THE APPLICANT SHALL NOTIFY BY TELEPHONE AND IN WRITING THE DEPARTMENT OF NATURAL RESOURCES, WATER POLLUTION CONTROL PROGRAM, POST OFFICE BOX 176, JEFFERSON CITY, MO 65102, 1-800-361-4827, OF ANY OIL SPILLS OR IF HAZARDOUS SUBSTANCES ARE FOUND DURING THE PROSECUTION OF WORK UNDER THIS PERMIT.

SEDIMENT CONTROL NARRATIVE

- THE PROPOSED PLAN WILL UTILIZE SEDIMENT BASINS AND DIVERSION BERMS.
- HYDRAULIC CALCULATIONS BASED ON DIVISION V, APWA SECTION 5100EROSION AND SEDIMENT CONTROL - SEPTEMBER 2010.  
  
SEDIMENT BASIN A  
Q = CIA C = 0.4  
I = 7.0 in/hr (Ic = 5 min, 5 yr RETURN PERIOD)  
A = 6.07 ac  
Q = (0.4)(7.0)(6.07) = 17 cfs  
SURFACE AREA = 1000 S.F. x (6.07 ac/1 ac da) = 6,070 s.f. (0.14 acres)  
VOLUME = 3600 x (6.07 ac)(1 ac da) = 21,852 cf  
PRINCIPAL OUTLET: 24" BARREL (TOP OF STAND PIPE = 4' ABOVE UPSTREAM BARREL INVERT)  
SPILLWAY: 20' FLAT BOTTOM DITCH W/4:1 SLOPES @ 1.0% 1.0' DEEP (E=4' ABOVE BARREL INVERT)  
TOP OF DAM: MINIMUM 8' WIDE (ELEV.=5' ABOVE UPSTREAM BARREL INVERT)

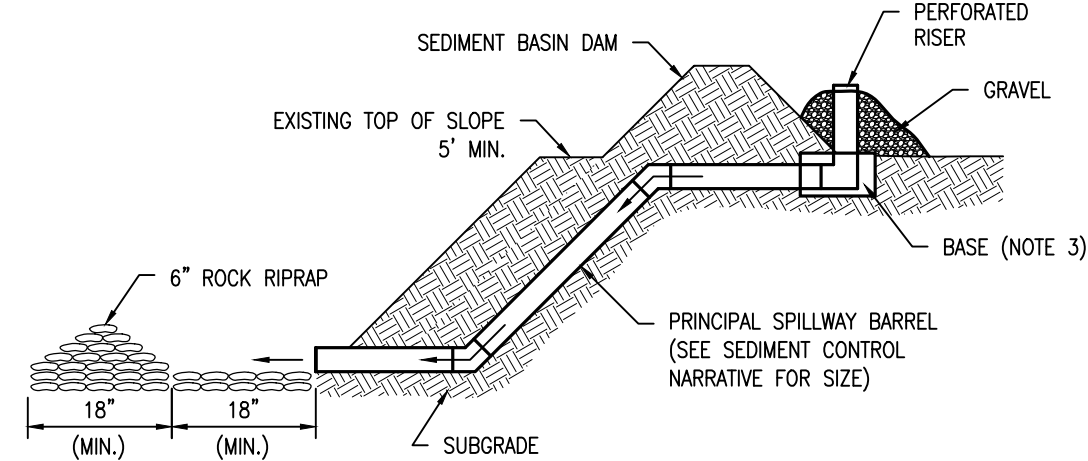
- SEDIMENT BASIN B  
Q = CIA C = 0.4  
I = 7.00 (Ic = 5 min, 5 yr RETURN PERIOD)  
A = 2.5 ac  
Q = (0.4)(7.0)(2.5) = 7.0 cfs  
SURFACE AREA = 1000 S.F. x (2.5 ac/1 ac da) = 2,500 s.f. (0.06 acres)  
VOLUME = 3600 x (2.5 ac)(1 ac da) = 9,000 cf  
PRINCIPAL OUTLET: 15" BARREL (TOP OF STAND PIPE = 4' ABOVE UPSTREAM BARREL INVERT)  
SPILLWAY: 10' FLAT BOTTOM DITCH W/4:1 SLOPES @ 1.0% 1.0' DEEP (E=4' ABOVE BARREL INVERT)  
TOP OF DAM: MINIMUM 8' WIDE (ELEV.=5' ABOVE UPSTREAM BARREL INVERT)

- OWNER SHALL MONITOR SILT LEVELS AND EROSION CONTROL STRUCTURES TO ENSURE PROPER MAINTENANCE. PERIODIC CLEANING WILL BE NECESSARY.
- BERMS, SEDIMENT BASINS, AND SEEDING AND MULCHING WERE CHOSEN BASED ON SITE TOPOGRAPHY AND DRAINAGE AREAS.
- THE PROPERTY OWNER SHALL ROUTINELY INSPECT ALL EROSION CONTROL STRUCTURES FOR CONDITION AND EFFECTIVENESS. FAILING STRUCTURES SHALL BE ADJUSTED OR RECONSTRUCTED. ALL EROSION CONTROL MEASURES SHALL COMPLY WITH THE QUARRY SWPPP.



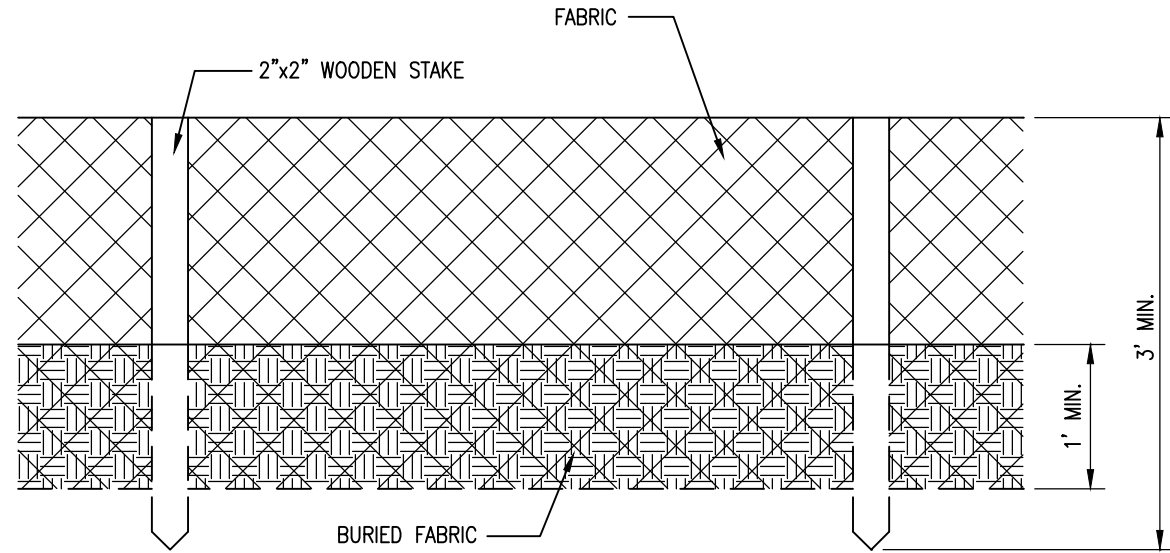
DIVERSION BERM DETAIL

N.T.S.



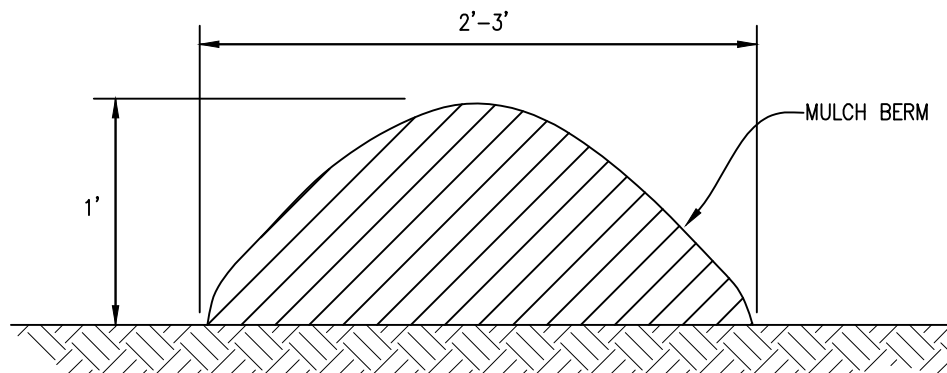
SEDIMENT BASIN DAM RISER PIPE

N.T.S.



SILT FENCE INSTALLATION

N.T.S.



MULCH BERM NOTES:

- MULCH BERMS MAY BE USED IN PLACE OF SILT FENCE.
- THE EROSION CONTROL BERM SHALL BE PLACED, UNCOMPACTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE CITY. BERM SHALL CONSIST OF COMPOST BERM OR SHREDDED MULCH BERM. SHREDDED MULCH FROM TREE REMOVAL ON PROJECT IS ACCEPTABLE.
- IF COMPOST, SEED WITH ANNUAL RYE IMMEDIATELY UPON PLACEMENT.
- DO NOT USE MULCH BERMS IN ANY RUNOFF CHANNELS.
- PLACE BERMS ON DENUDED AREAS AS SOON AS POSSIBLE. MULCH/COMPOST AND/OR TEMPORARY OR PERMANENT VEGETATION SHALL BE APPLIED/ESTABLISHED ABOVE THE MULCH BERMS WHEN NECESSARY FOR ADDITIONAL EROSION CONTROL.
- WHEN SEDIMENT FILLS THE AREA BEHIND THE MULCH BERM TO 1/2 THE HEIGHT OF THE MULCH BERM, THE CONTRACTOR SHALL REMOVE THE SEDIMENT AND PLUGGED MULCH AND RESHAPE BERM WITH CLEAN MULCH AS NEEDED.
- WATER FROM TRENCH DEWATERING TO BE PUMPED BEHIND COMPOST BERM OR WATTLE TO BE FILTERED.

MULCH BERM

N.T.S.

# Attachment 2, Riparian Vegetation Management Plan

**Trager Limestone LLC Nettleton Quarry  
Riparian Vegetation Management Plan  
Allstate Consultants LLC  
March 14, 2022**

This proposed riparian project would convert approximately 4.7 acres of quarry property along 1,012 linear feet of Kettle Creek on property leased by Trager Limestone L.L.C. to forested riparian buffer. The riparian project will be completed in the area labeled as "Vegetated Riparian Zone" on construction plan sheet 1 of 2. The Vegetated Riparian Zone includes the restored stream banks and the entirety of the area included in the Vegetated Riparian Zone outside of the stream banks. The existing land use is limestone quarry. A portion of the site is currently vegetated. All operations for this project will be conducted in the general sequence presented in Table 1.

### **Site Preparation**

Tree planting sites will be prepared for mechanical or hand planting of bare root seedlings between approximately September 15, 2022 and May 15, 2023. If necessary, an 8-inch layer of topsoil will be placed upon areas where trees are planted. A combination of mowing and chemical application will be used to prepare the planting area within existing vegetation. Herbicides may be applied in the fall, before killing frost, or early in the spring when the grass is approximately 6-8" tall. Fall spraying may be done with a glyphosate-based herbicide. Spring spraying may be completed with glyphosate or pre-emergent herbicides. Recommended pre-emergent herbicides include Oust, Surflan, and Princep. In the fall or spring, mowing the planting area and allowing 6-8" of regrowth before herbicide application can improve performance. Mowing and allowing 6-8" of regrowth in the planting area before applying herbicide in the spring may improve herbicide effectiveness.

### **Tree Planting**

A mix of bare root native hardwoods suitable for the site will be planted on a 10' x 10' spacing (stocking density of 435 trees per acre) in unvegetated areas including, the restored stream banks and the entirety of the Vegetated Riparian Zone outside of the restored stream banks. Where current native vegetation exists, supplemental plantings may be done using common forestry techniques. The trees may be planted using a mechanical planter or hand planted. The project will attempt to maintain the density of native hardwood trees of approximately 348 live stems per acre, for the first 5 years of the project.



Tree / Shrub Species	Amount to order
Cottonwood	200
Bur oak	525
American Sycamore	500
Pin oak	525
Northern red oak	300
<b>TOTAL</b>	<b>2,050</b>

## Management

During the first five years of establishment, competing vegetation will be controlled with mowing and herbicide at least once during the growing season. Mowing between the rows may be conducted during the first two years of establishment. Herbicide weed control may be conducted annually for the first five years.

## Herbicide Weed Control

For the first five growing seasons, the project will attempt to control weed and grass competition by one of the following methods:

- 1) Marking tree rows and spraying a 4' wide strip down each row with a pre-emergent herbicide (such as Oust) just prior to tree planting can be utilized as the first year weed control. Otherwise, an herbicide labeled for tree plantations (such as Fusilade) should be sprayed immediately after planting in a 4' circle around the base of each tree or in a 4' strip over the rows.
- 2) Subsequent (year 2-5) weed control treatments can utilize either a pre-emergent herbicide application applied before the growing season or post emergent, tree plantation labeled herbicide during the growing season.
- 3) Mulch can be used in place of herbicides in a 3-4' circle around the base of each tree.
- 4) Take care when mowing between the tree rows so not to damage the young trees with equipment.

Invasive species may be controlled as needed. If stem densities fall below 348 live stems, bare root seedlings of the same species mix may be hand planted in the locations to increase the densities to approximately 348 live stems per acre.

TABLE 1 – Mitigation work plan for riparian buffer establishment project on property owned by Trager Limestone L.L.C., Caldwell County, MO.

<b>Practice</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
<b>Site Preparation</b>						
Lay down topsoil	X					
Mow		X				
Herbicide Application (glyphosate)	X					
Herbicide Application (glyphosate or pre-emergent)		X				
<b>Tree Planting</b>						
Order bare root seedlings	X					
Mechanical Planting		X				
<b>Monitoring and Maintenance</b>						
Weed Control w/herbicide		X	X	X	X	X
Mowing	X	X				
Bare root seedlings (if needed)			X	X	X	X
Hand Planting (if needed)			X	X	X	
<b>Easement</b>						
Survey and Boundary Posting	X					
Legal Work	X					
<b>Monitoring and Report Writing</b>		X	X	X	X	X

### Operation and Maintenance Plan

Maintenance will generally consist of activities highlighted in Table 1. Annual inspections will be conducted by Trager Limestone L.L.C. or its agent. Annual reports will be submitted to the EPA Project Manager by December 31<sup>st</sup> of each year for the first five years. After the first five years, maintenance may consist of routine invasive species control according to Table 2 and the latest Missouri Noxious Weed list using appropriate herbicides or mechanical removal methods. Litter will be routinely removed.

### Performance Standards

In areas that are currently unforested a mix of native species, appropriate for the site will be planted on a 10' x 10' spacing grid (435 trees per acre). Trees will be monitored annually for five years using common forestry techniques. During that time, if the densities of native hardwood trees falls below 348 stems per acre, additional bare root seedlings may be planted.

A target density of 250-400 stems/acre and 85% canopy coverage is the goal of the site after five years. Planted species will be monitored for a consistent increase in height, lateral growth, and root collar diameter. Maintenance may be implemented to protect plantings from predation including mowing between the rows for at least two years.



## **Monitoring Requirements**

Annual vegetative monitoring may be conducted to evaluate progress toward performance standards.

Vegetative monitoring may include 1) measurements of height, lateral growth, and root collar diameter, 2) density of all trees by species including regeneration, composition, density, diameter at breast height (DBH), and height of all planted trees to determine survivability and growth rate, 3) density and/or estimated coverage of all exotic species, and 4) composition and estimated coverage of shrub and herbaceous (dominant, 10% or greater coverage) species.

## **Long-term Management Plan**

Once performance standards have been met, long-term maintenance may be required including occasional timber stand improvement activities such as hazard tree removal, control of invasive species, and litter pickup.

## **Adaptive Management Plan**

If the mitigation plan described above does not function as anticipated, or functional problems are identified, EPA will be notified and additional actions will be evaluated.

TABLE 2 – List of Missouri noxious weeds and undesirable plant species.

Common Name	Scientific Name
Garlic Mustard	<i>Alliaria petiolata</i>
Marijuana	* <i>Cannabis sativa</i>
Musk Thistle	* <i>Carduus nutans</i>
Spotted Knapweed	<i>Centaurea stoebe micranthos</i>
Canada Thistle	* <i>Cirsium arvense</i>
Field Bindweed	* <i>Convolvulus arvensis</i> L.
Common Teasel	* <i>Dipsacus fullonum</i>
Cut-leaf Teasel	* <i>Dipsacus lanciniatus</i>
Autumn Olive	<i>Elaeagnus umbellata</i>
Wintercreeper	<i>Euonymus fortunei</i>
Leafy Spurge	<i>Euphorbia esula</i>
Serecia Lespedeza	<i>Lespedeza cuneata</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>
Bush Honeysuckle	<i>Lonicera morrowii/maackii</i>
Purple Loosestrife	* <i>Lythrum salicaria</i>
Scotch Thistle	* <i>Onopordum acanthium</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>
Common Reed	<i>Phragmites australis</i>
Kudzu	* <i>Pueraria lobata</i>
Common Buckthorn	<i>Rhamnus cathartica</i>
Multiflora Rose	* <i>Rosa multiflora</i>
Crown Vetch	<i>Seurigera varia</i>
Sesbania	<i>Sesbania exaltata</i>
Johnson Grass	* <i>Sorghum halpense</i>
Japanese Hop	* <i>Humulus japonicus</i>
Callery Pear	* <i>Pyrus calleryana</i>

\*Species identified on the Missouri Noxious Weed List and require 100% eradication as required by the EPA.

# Attachment 3, Stream Restoration Stormwater Pollution Prevention Plan (SWPP)

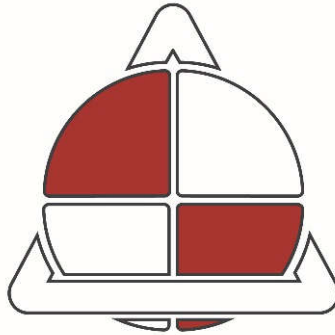
# ***TRAGER LIMESTONE, LLC***

## ***NETTLETON QUARRY***

***9010 NE DES MOINES ROAD  
HAMILTON, MO 64644***

***Allstate Project #: 20223.01***

### ***STORM WATER POLLUTION PREVENTION PLAN (SWPPP)***



**ALLSTATE  
CONSULTANTS**

***Allstate Consultants LLC***  
3312 LeMone Industrial Blvd.  
Columbia, Missouri 65201  
P: (573) 875-8799  
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allstateconsultants.net

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Stream Restoration Construction Phase  
Storm Water Pollution Prevention Plan  
(SWPPP)

for

Trager Limestone, LLC Nettleton Quarry

in

Hamilton, MO  
(Caldwell County)

Prepared for:

Trager Limestone, LLC Nettleton Quarry  
9010 NE Des Moines Road  
Hamilton, MO 64644

February 16, 2022

by:

Allstate Consultants LLC  
3312 LeMone Industrial Blvd.  
Columbia, Missouri 65201  
Phone: (573) 875-8799  
Fax: (573) 875-8850

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**PART 1.0**  
**INTRODUCTION**



## **1.0 INTRODUCTION**

### **1.1 THE CONSTRUCTION NPDES PERMIT AND SWPPP**

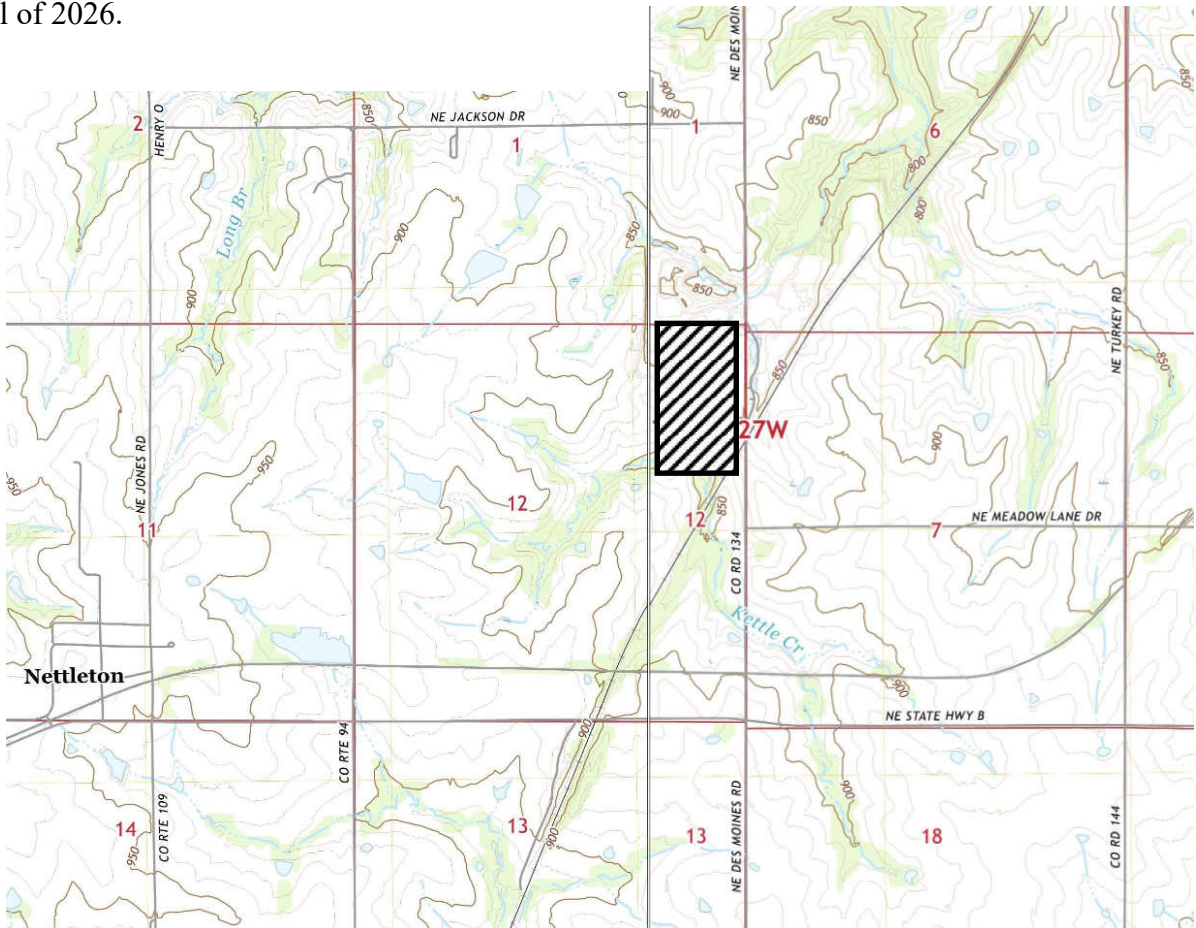
The NPDES general permit is for storm water discharges from construction activities that are classified as "associated with industrial activity" by EPA regulation. For construction projects that require the disturbance of more than one acre the U. S. Environmental Protection Agency (EPA) requires that the project owner or contractor apply for a storm water permit under the National Pollutant Discharge Elimination System (NPDES) program. For the purposes of the NPDES program, construction activities are defined as clearing, excavating, grading, or other land disturbing activities.

The State of Missouri is delegated by the EPA to administer the NPDES general permit for construction activities within the state that disturb one acre or more. A Missouri State Operating Permit for storm water discharges is required in accordance with Missouri regulations 10 CSR 20-6.200. Under the Missouri Clean Water Law, the Missouri Department of Natural Resources, Division of Environmental Quality, Water Pollution Control Program requires Form E - Application for General Permit and a Form G - Application for Storm Water Permit, or Form O- Permit for Land Disturbance (if the site is less than five acres in size).

This document comprises the Storm Water Pollution Prevention Plan (SWPPP) required by the State of Missouri Department of Natural Resources (MDNR), Division of Environmental Quality. This SWPPP establishes a plan to manage the quality of storm water runoff from stream restoration construction activities associated with the Trager Limestone, LLC Nettleton Quarry in Hamilton, Missouri. This SWPPP is separate from the quarry operations SWPPP which addresses routine day to day operations within the quarry. If any portion of this construction SWPPP is in conflict with the quarry operations SWPPP, the more stringent requirement will apply. Upon completion of the stream restoration construction project, the quarry operations SWPPP should be updated to reflect the restored stream and improved sediment basins.

## 1.2 PROJECT LOCATION AND DESCRIPTION

This project is located in Caldwell County east of Hamilton, MO. in Section 12, T57N, R27W or 39° 46' 18" N 93° 52' 14" W. (see figure1-1 on following page). The total land area to be disturbed during the construction process is approximately 5.0 acres. Construction should be completed by Fall of 2026.

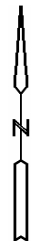


**Figure 1-1**  
**Regional Area**  
**Trager Limestone, LLC Nettleton Quarry**  
**Caldwell County, Missouri**  
**Date: February 15, 2022**

LEGEND	
Project area	

**Location:**     **Nettleton Quadrangle**  
                       **Sec 12, T57N, R27W**  
                       **Columbia, Missouri**

PREPARED BY: Allstate Consultants LLC  
 3312 LeMone Industrial Boulevard.



Columbia, Missouri 65201  
573-875-8799

### **1.3 PROJECT OWNER AND OPERATOR**

The project owner is Trager Limestone, LLC Nettleton Quarry. The address is:

9010 NE Des Moines Road  
Hamilton, Missouri 64644

The project contractor is TBD.

The primary contact for this project is Zach Link (Supervisor). Mr. Link can be reached at (660) 644-5821. He is also the Storm Water Inspector and 24 hour Emergency contact for this project.

### **1.4 CONTRACTOR/SUBCONTRACTOR SIGNATORY REQUIREMENTS AND CERTIFICATION**

Before conducting any construction disturbances, all contractors and subcontractors must sign a copy of the following certification statement at the owner's office.

### **1.5 RETENTION OF RECORDS**

Trager Limestone, LLC Nettleton Quarry, as owner, must maintain a copy of this SWPPP on site from the date of project initiation to the date of final stabilization. The Owner shall retain copies of the SWPPP and all reports required by the General Permit for a period of at least three years from the date that the project is completed.

### **1.6 STANDARD PERMIT CONDITIONS**

This section contains information on state and federal penalties for non-compliance with the permit as well as termination of coverage of the permit. Further explanation of these issues is stated under each individual heading.

#### **1.6.1 Duty to Comply with Permit Conditions**

The EPA has substantial penalties for non-compliance with the permit. Any permit non-compliance constitutes a violation of the Clean Water Act and is grounds for enforcement action including: permit termination; revocation, reissuance, or modifications; or denial of permit renewal application. Individuals responsible for such violations are subject to criminal, civil and administrative penalties.

#### **1.6.2 Final Stabilization and Termination of Coverage**

Final stabilization is achieved when all soil-disturbing activities at the site have been completed and when a uniform perennial vegetative cover with a density of 70 percent has been established or equivalent measures (such as the use of riprap, gabions, or geotextiles) have been employed. When the site has been fully stabilized and all storm water discharges from construction activities that are authorized by this permit are eliminated, the final stabilization termination checklist must be completed. Upon completion and submission of MDNR termination Form H, the project will be considered complete.



CONTRACTOR'S CERTIFICATION		
"I certify under penalty of law that I understand the terms and conditions of this Missouri Storm Water Pollution Prevention Plan and associated NPDES general permit that authorizes the storm water discharges associated with industrial activity from construction site identified as part of this certification".		
Signature	For	Responsible For
_____ (Name)	_____ (Company)	_____ _____
_____ (Position)	_____ (Street / P.O. Box)	_____ _____
_____ (Signature)	_____ (City, State, Zip)	_____ _____
_____ (Date)	_____ (Phone)	_____ (Activity)
_____ (Name)	_____ (Company)	_____ _____
_____ (Position)	_____ (Street / P.O. Box)	_____ _____
_____ (Signature)	_____ (City, State, Zip)	_____ _____
_____ (Date)	_____ (Phone)	_____ (Activity)
_____ (Name)	_____ (Company)	_____ _____
_____ (Position)	_____ (Street / P.O. Box)	_____ _____
_____ (Signature)	_____ (City, State, Zip)	_____ _____
_____ (Date)	_____ (Phone)	_____ (Activity)

**PART 2.0**  
**CONSTRUCTION ACTIVITIES**  
**AND SITE DESCRIPTION**

## **2.0 CONSTRUCTION ACTIVITIES AND SITE DESCRIPTION**

### **2.1 DESCRIPTION OF CONSTRUCTION ACTIVITIES**

The scope of this project includes restoration of approximately 1000' of stream channel and development of a riparian buffer for the restored stream. The scope also includes construction of 2 sediment basins and shoring up of berms to direct flow to the sediment basins, all in the active quarry operations area. A tentative sequence of major construction activities follows in Section 2.6. The total area of the site is approximately 90.0 acres. The total area of the site expected to undergo temporary disturbance for stream restoration is approximately 5.0 acres. The area of the site that will be impacted by the construction of the sediment basins and berms is 4.0 acres but it is in an area that is in a state of perpetual disturbance due to quarry operations. The quarry operating SWPPP will be revised to address the sediment basins and berms after construction of this project is complete. Soil disturbing activities within the construction area may include clearing and grubbing, and grading. All construction activities will disturb as little of the existing vegetation as possible.

### **2.2 POTENTIAL POLLUTANTS**

The primary pollutant sources will be disturbed soils and subsequent surface water runoff within the construction site. Other potential pollutant sources include petroleum products needed for the construction equipment. If additional pollutant sources are brought on site, such as portable toilets, chemicals, paint, solvents, etc., these items will be noted and monitored on the storm water site inspection form.

### **2.3 SOILS**

The site is an active quarry with the majority of soil removed to expose rock.

### **2.4 ESTIMATE OF RUNOFF COEFFICIENT**

The runoff coefficient "C" is the ratio of the volume of storm water runoff from the project area compared to the total volume of precipitation that falls on the project area. The General Permit

requires an estimate of this ratio that represents runoff conditions both before construction and after construction activities are complete and the area is finally stabilized.

The estimate of "C" is based on variables from three general terrain categories: 1) soil properties (porosity, density, etc.), 2) ground slope, and 3) the character of the vegetative cover (woodlands, pasture, grassland, etc.). Another major variable affecting "C" is rainfall intensity and duration. For any given terrain, the ratio of runoff to rainfall is expected to increase as storm intensity or duration increases.

Pre-construction "C" value = 0.50

Post-construction "C" value = 0.50

## **2.5 SITE MAPS**

A location map shows the project area relative to the surrounding area and is shown as Figure 1-1. The construction drawings for the facility are in Appendix A and include placement of erosion and sediment controls. Detailed descriptions of these Best Management Practices, or BMP's, are included in Appendix D.

## **2.6 SEQUENCE OF MAJOR CONSTRUCTION ACTIVITIES**

This section contains a description of the construction sequence for the project.

- Secure necessary Land disturbance permits.
- Installation of erosion and sediment control devices.
- Excavation and grading activities
- Finish grading and stabilization
- Seed and mulch to stabilize

## **2.7 RECEIVING WATERS**

The project site drains to Kettle Creek.



## **2.8 DRAINAGE AREAS**

In compliance with EPA and DNR regulations, clearing and grubbing within fifty (50) feet of defined drainage course should be avoided. Additionally, when changes to defined drainage courses occur as part of the project, clearing and grubbing within fifty (50) feet of the defined drainage course will be delayed until all materials and equipment necessary to protect and complete the drainage change are on site. Changes to the defined drainage course will be completed as quickly as possible once the work has been initiated. The area impacted by the land disturbance of the drainage course change will be revegetated or protected from erosion as quickly as possible. Areas within fifty (50) feet of defined drainage ways will be recontoured as needed, as well as revegetated, seeded, or otherwise protected within five (5) working days after grading has ceased.

### **2.8.1 Sedimentation Basins/Traps**

A sedimentation basin/trap will be used when necessary, and will be sized to comply with the governing authorities guidelines. The basin/trap will be cleaned out and otherwise maintained as needed until the drainage area is stabilized. Both temporary and permanent sedimentation basins will have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

**PART 3.0**  
**BEST MANAGEMENT PRACTICES**

### **3.0 BEST MANAGEMENT PRACTICES**

#### **3.1 EROSION AND SEDIMENT CONTROL DEVICES**

Soil erosion and sediment controls are measures that are used to reduce the amount of soil particles that are carried off of a land area and deposited in receiving water. This section, in conjunction with Appendix D, provides a general description of the most appropriate measures planned for this project. Appendix A contains construction drawings that clearly delineate each BMP proposed and its location. All applicable soil erosion and sediment control measures shall be implemented in accordance with the guidelines contained herein prior to commencement of field construction activities. Measures shall be maintained during and after the construction activity until final stabilization is accomplished. Upon successful revegetation of the disturbed area, all temporary soil erosion and sediment control measures will be removed. Appropriate impediments for storm water discharge will be implemented, and bench marks referenced for proper installation, operation, and maintenance of drainage courses.

##### **3.1.1 Temporary Stabilization**

Temporary stabilization consists of activities such as terracing, mulching, or reseeding vegetation in all disturbed, unvegetated areas that are exposed during prolonged periods of construction inactivity. Due to the short nature of the many project activities, temporary stabilization will not always be required. However, temporary stabilization measures will be implemented if construction halts for more than 14 days and if construction will not resume within 21 days. If the slope is greater than 3:1, or greater than 3% and greater than 150 feet in length; the area will be protected from erosion by stabilizing the area with mulch, or another similarly effective BMP, if the activity ceases for more than 7 days. Exceptions include: 1) Snow or frozen ground; 2) Activities that will resume after 14 days; or 3) Arid or Semi-arid areas. This requirement does not apply to sedimentary basins or areas that drain thereto.

### **3.1.2 Permanent Stabilization**

Permanent stabilization consists of the final planting of vegetation in all disturbed, unvegetated areas affected by construction. Permanent stabilization (groundcover) practices will be properly implemented within 30 days of final construction. See the Riparian Vegetation Management Plan and Section 3.3 of this document for further details.

### **3.1.3 Temporary Erosion Control Practices**

Prior to initiating construction, all temporary erosion and sediment control practices shown on the construction drawings will be in place. The erosion and sediment control details for these practices are located in Appendix D.

## **3.2 MAINTENANCE**

All erosion and sediment control devices shown on the construction drawings shall be installed pursuant to the specifications in the construction details in Appendix D. These erosion and sediment control devices shall be checked: 1) on a weekly basis; and 2) within 72 hours of each 0.5-inch or greater rainfall event. A good faith effort will be made to inspect erosion and sediment control devices within 24 hours of a rainfall event that occurs Monday through Thursday.

Maintenance inspection reports will be completed after each inspection and included in the project file. If inspection results indicate a need for revision to the SWPPP, the plan shall be revised and implemented as appropriate, within seven calendar days following the inspection. The inspection reports shall identify any incidents of non-compliance. Copies of the report forms are to be completed by the designated SWPPP personnel inspector. A copy of the form to be used is attached in Appendix B and will be photocopied and used as needed for individual inspections.

Ineffective temporary erosion control measures shall be reported to the owner/contractor within 24 hours of identification so that they may be repaired in an efficient manner. Sediment will be removed from behind a silt fence when it reaches one-third the height of the barrier. The temporary erosion control devices shall be left in place until the site is permanently stabilized with vegetation

(at least 70 percent cover). Following the completion of construction and planting activities, the construction inspector shall conduct periodic site reviews to ensure that vegetation establishment is satisfactory. If vegetation cover is not adequate, special steps to correct problems shall be implemented such as re-seeding, mulching, sodding, or the use of erosion control blankets.

### **3.3 FINAL STABILIZATION AND CLEAN UP**

After completion of final grading, the disturbed areas will be revegetated as per the Riparian Vegetation Management Plan. All temporary soil erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

All disturbed areas to be revegetated shall be seeded in accordance with soil erosion and sediment control practices. Revegetation of upland areas shall be conducted as specified in Table 3-1.

#### **3.3.1 Seeding**

When unfavorable conditions preclude permanent seeding, a temporary ground cover of quick germinating grasses shall be established as described in Appendix D. Permanent seeding will be done over all areas of soil disturbance as per the Riparian Vegetation Management Plan.

#### **3.3.2 Fertilizing**

Fertilizer shall be applied as per the construction plans.

**PART 4.0**  
**OTHER POLLUTION**  
**PREVENTION CONTROLS**



## **4.0 OTHER POLLUTION PREVENTION CONTROLS**

### **4.1 WASTE DISPOSAL**

All waste material will be collected and stored in a secure container or removed from the project site. The waste container will be inspected regularly with contents disposed of properly by the owner. No waste oil or other petroleum-based products will be disposed of on site (e.g. buried, poured, etc.); but shall be taken off-site for proper disposal.

### **4.2 HAZARDOUS WASTE**

Any hazardous waste material will be disposed of in the manner specified by local and state regulations and by the manufacturer. Site personnel will be instructed to be aware of this requirement (see Part 5).

### **4.3 SANITARY WASTE**

All sanitary waste will be collected from portable units as required and properly disposed of off-site in compliance with local and state regulations.

### **4.4 OFF-SITE VEHICLE TRACKING**

Public roads that provide access to the right-of-way will be monitored for any unusual tracking of sediments (mud, etc.) from the site onto the road as follows:

- 1) Weekly during dry periods, and
- 2) Daily after rainfall events that leave the project area wet and construction activity is proceeding.

The same inspection process will be implemented for the generation of dust during dry periods.

### **4.5 NON-STORM WATER DISCHARGES**

There are no non-storm water discharges expected with this construction activity. However, the following non-storm water discharges are allowed under section 1.3 B of the CGP:

1. Discharges from fire-fighting activities
2. Fire hydrant flushings

3. Waters used to wash vehicles where detergents are not used
4. Water used to control dust in accordance with Subpart 3.4 G of the CGP
5. Portable water including uncontaminated water line flushings
6. Routine external building wash down that does not use detergents.
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
8. Uncontaminated air conditioning or compressor condensate.
9. Uncontaminated ground water or spring water
10. Fountain or footing drains where flows are not contaminated with process materials such as solvents.
11. Uncontaminated excavation dewatering
12. Landscape irrigation

**PART 5.0**  
**SPILL PREVENTION AND CONTROL PLAN**

## **5.0 SPILL PREVENTION AND CONTROL PLAN**

### **5.1 INTRODUCTION**

The Spill Prevention and Control Plan (SPCP) describes measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the proposed project in the State of Missouri. The quarry also has a general SPCP to cover routine quarry operations. If any portion of this construction SPCP is in conflict with the general SPCP, the more stringent requirement will apply. This plan identifies the potentially hazardous materials to be used during this project; describes transport, storage, and disposal procedures for these substances; and outlines procedures to be followed in the event of a spill of a contaminating or toxic substance.

### **5.2 MATERIAL MANAGEMENT PRACTICES**

Properly managing these materials on the construction site will greatly reduce the potential for storm water pollution of these materials. Good housekeeping along with proper use and storage of these construction materials form the basis for proper management of potentially hazardous material.

#### **5.2.1 Good Housekeeping**

The proper use of materials and equipment along with the use of general common sense greatly reduces the potential for contaminating storm water runoff. The following is a list of good housekeeping practices to be used during the construction project:

- Storage of hazardous materials, chemicals, fuels, and oils and fueling of construction equipment, shall not be performed within 100 feet of any stream bank, wetland, water supply well, spring, or other water body.
- Contractor and contractor's employees shall be properly trained in handling materials used and/or kept at the job site.
- Contractors shall have proper access to all necessary safety items.
- Trash containers will be provided for waste disposal, and regular site clean-up will be conducted.

- An effort will be made to store only enough product required to do the job.
- Materials stored on the site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacture's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of the product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal of a product will be followed.
- If surplus product must be disposed of, manufacturers or local and state recommended methods for proper disposal will be followed.
- When possible, materials should be stored with secondary containment and in a covered structure such as a building or job trailer.

## **5.2.2 Product-Specific Practices**

Due to the chemical makeup of specific products, certain handling and storage procedures are required to promote the safety of handlers and prevent the possibility of pollution. Care shall be taken to follow all directions and warnings for products used on the site. All pertinent information can be found on the Material Safety Data Sheets (MSDS) for each product. The MSDS sheets should be located with each product container they represent. Several product-specific practices are listed in the following sections.

### **5.2.2.1 Petroleum Products**

On-site vehicles will be monitored for leaks and receive regular maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, that are clearly labeled. Preferably the containers will be stored in a covered truck or trailer that provides secondary containment for the products.

Bulk storage tanks having a capacity of greater than 55 gallons will be provided with secondary containment. Containment can be provided by a temporary earthen berm or other means. After each rainfall, the contents of the secondary containment area will be inspected by the contractor. If there is no visible sheen on the collected water, it will be pumped away in a manner that does not cause scouring. If a sheen is present, it must be cleaned up prior to discharging the water.

Bulk fuel or lubricating oil dispensers shall have a valve that must be held open to allow the flow of fuel. During fueling operations, the contractor shall have personnel present to detect and contain spills.

#### **5.2.2.2 Fertilizers**

Fertilizers used to stimulate vegetation growth will be used in minimal amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to storm water.

### **5.3 SPILL CONTROL AND CLEANUP**

In addition to the best management procedures discussed previously, the following spill control and cleanup practices will be followed to prevent storm water pollution in the event of a spill:

- Spills will be contained and cleaned up immediately after discovery.
- Manufacturers' methods for spill cleanup of a material will be followed as described on the material's MSDS.
- Materials and equipment needed for cleanup procedures will be kept readily available on the site, either at an equipment storage area or on contractor's trucks. Equipment to be kept on the site will include but not be limited to brooms, dust pans, shovels, granular absorbents, sand, saw dust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
- Personnel on the site will be made aware of cleanup procedures and the location of spill cleanup equipment.
- Toxic, hazardous, or petroleum product spills required to be reported by regulation will be documented to the appropriate federal, state, and local agencies.
- Spills will be documented and a record of the spills will be kept with this SWPPP.



If a spill occurs that is reportable to the federal, state, or local agencies, the contractor is responsible for making the notifications.

The federal reportable spill quantity for petroleum products is defined in 40 CFR 11.0 as any oil spill that:

- Violates applicable water quality standards,
- Causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or,
- Causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

Currently in the State of Missouri, a reportable spill of petroleum is the discharge into the environment of more than 50 gallons. It is the responsibility of the owner and contractor to comply with current regulations if changes were to occur.

A list of commonly used hazardous materials and reportable quantities is included in Appendix C of this document; however, the federal reportable spill quantities for all hazardous materials are listed in 40 CFR, Part 302.4 in the table entitled "List of Hazardous Substances and Reportable Quantities." A procedure for determining a reportable spill is included in Appendix C along with a copy of the Spill Report Form to be filled out in case of a spill.

The reportable spill quantity for hazardous materials in the State of Missouri follows the Federal reportable quantity listed in 40 CFR, Part 302.4

If a spill is reportable, the contractor's superintendent will, within 2 hours of the spill, notify the Owner, as well as:

Federal:

National Response Center - 1-800-424-8802

EPA Region 7: 24-hour Emergency Response Center - (913) 281-0991

State:

Missouri Emergency Response Commission

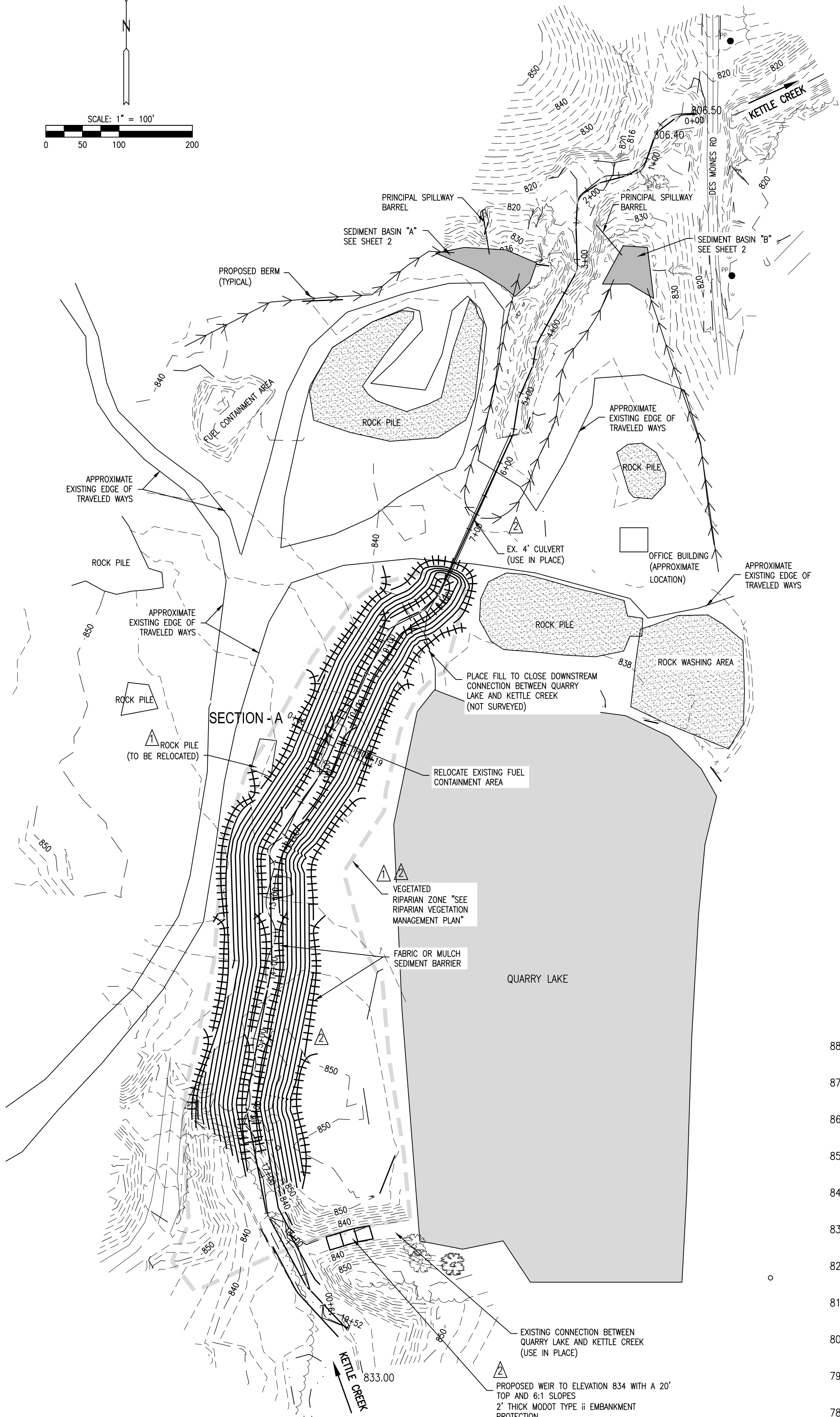
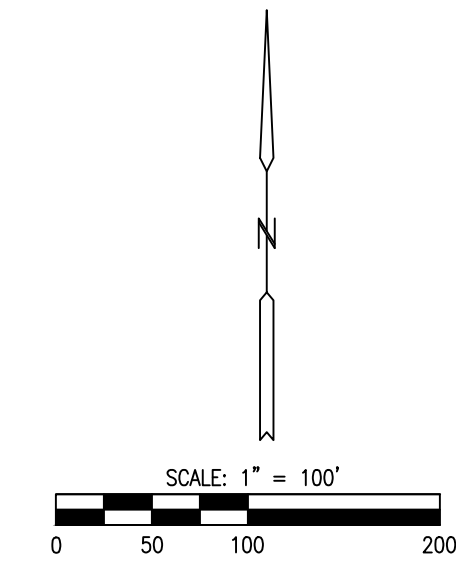
Department of Natural Resources

(573) 634-2436 (in-state, 24 hours)

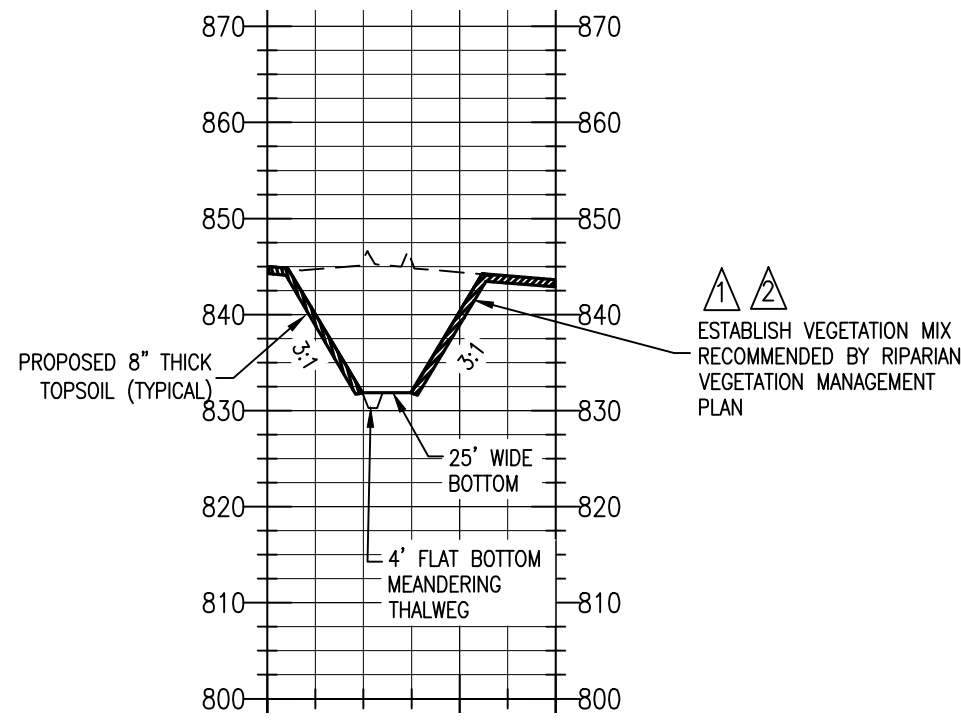
If a reportable release occurs, a modification to the SWPPP must be made within 14 days. The modification shall include: a description of the release, the date of the release; an explanation of why the spill happened; a description of procedures to prevent future spills or releases from happening; and a description of response procedures should a spill or release occur again. A written description of the release must be submitted to the permitting authority that includes: a description of the release, including the type of material and an estimated amount of spill; the date of the release; an explanation of why the spill happened; and a description of the steps taken to prevent and control future releases. These modifications to the SWPPP must be made by the contractor and will be documented on the form in Appendix C.

## **APPENDICIES**

**APPENDIX A  
CONSTRUCTION  
PLANS AND DETAILS**



KETTLE CREEK  
DRAINAGE AREA = 1.68 SQ. MI.  
Q<sub>2</sub> = 445 CFS  
Q<sub>10</sub> = 1,100 CFS  
Q<sub>100</sub> = 2,090 CFS



## SECTION - A



### GENERAL NOTES:

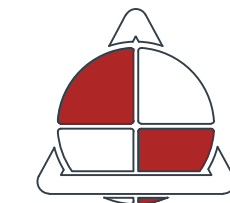
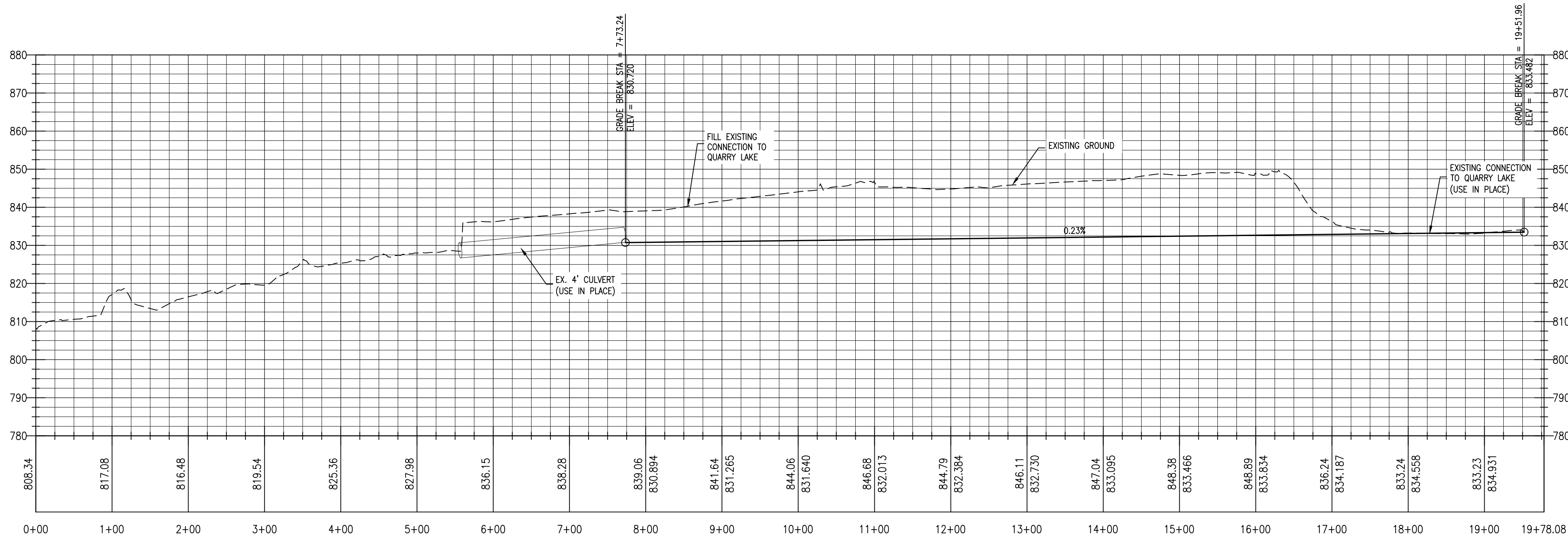
1. THERE ARE TWO STORM WATER POLLUTION PREVENTION PLANS (SWPPPs) IN EFFECT ON THE QUARRY SITE. BOTH SWPPPs ARE TO BE MAINTAINED DURING CONSTRUCTION OF THE STREAM RESTORATION.
2. THE GENERAL SITE SWPPP WHICH COVERS ROUTINE QUARRY OPERATIONS.
3. THE STREAM RESTORATION PROJECT SWPPP WHICH COVERS THE COMPONENTS OF THIS STREAM RESTORATION PROJECT.
4. WATER FOR PLANTS AND DUST SUPPRESSION SHALL BE TAKEN FROM QUARRY LAKE.
5. FILL TO CLOSE DOWNSTREAM CONNECTION BETWEEN QUARRY LAKE AND KETTLE CREEK SHOULD BE MATERIALS EXCAVATED FROM THE STREAM RESTORATION, BUT MUST BE TOPPED WITH 8" OF TOPSOIL AND INCLUDED IN TEMPORARY SEEDING AND RIPARIAN VEGETATED MANAGEMENT PLAN.
6. THE WEIR BETWEEN KETTLE CREEK AND QUARRY LAKE SHOULD BE LINED WITH 2' OF MODOT TYPE 2 EMBANKMENT PROTECTION PER MODOT STANDARD SPECIFICATIONS.

### CONSTRUCTION SEQUENCING:

- STEPS 1- 8 ARE TO BE COMPLETED BY AUGUST 1, 2022.
1. CONSTRUCT SEDIMENT BASINS A AND B AND THEIR ASSOCIATED BERMS PRIOR TO CONSTRUCTION OF THE STREAM RESTORATION.
  2. EXCAVATE 25' WIDE TRAPEZOIDAL RESTORATION CHANNEL TO 8" BELOW FINISHED GRADE SHOWN ON PLANS USING EXCAVATORS, BULLDOZERS, SKIDSTEERS, ROAD GRADERS OR OTHER SUITABLE EQUIPMENT. EXCAVATED MATERIAL SHALL BE HAULED TO A LOCATION ON SITE AND STOCKPILED, RECYCLED OR USED IN ACCORDANCE WITH THE SITE SWPPP. EROSION CONTROL SHALL BE PROVIDED FOR STOCKPILED MATERIALS AS DIRECTED IN THE SITE SWPPP TO PREVENT SEDIMENT LADEN DRAINAGE INTO THE WATERS OF THE UNITED STATES.
  3. SMOOTH THE 3:1 EXCAVATED CHANNEL WALLS TO 8" BELOW FINISHED GRADE TO PRODUCE A CONSISTENT FINISHED GRADE WITH SLOPES NO STEEPER THAN 3:1 USING EXCAVATORS, BULLDOZERS, SKIDSTEERS, ROAD GRADERS OR OTHER SUITABLE EQUIPMENT.
  4. USING AN EXCAVATOR, EXCAVATE THE 4' WIDE MEANDERING THALWEG TO DIMENSIONS, PLATFORM AND FINISHED GRADE SHOWN ON PLANS.
  5. CONSTRUCT WEIR BETWEEN KETTLE CREEK AND UPSTREAM CONNECTION TO QUARRY LAKE.
  6. PLACE FILL TO CLOSE DOWNSTREAM CONNECTION BETWEEN QUARRY LAKE AND KETTLE CREEK.
  7. PLACE 8" OF TOP SOIL ON THE 3:1 SIDE SLOPES AND THE VEGETATED RIPARIAN ZONE. TOPSOIL IS NOT NECESSARY FOR THE CHANNEL BOTTOM OR MEANDERING THALWEG.
  8. IMPLEMENT TEMPORARY SEEDING, FERTILIZER AND MULCH OVER VEGETATED RIPARIAN ZONE EXCEPT UNDISTURBED VEGETATED AREAS THAT ARE ALREADY ADEQUATELY (70%) VEGETATED.
  9. IMPLEMENT THE RIPARIAN VEGETATION MANAGEMENT PLAN OVER THE ENTIRE VEGETATED RIPARIAN ZONE WITH THE EXCEPTION OF THE MEANDERING THALWEG.

### TEMPORARY SEEDING, FERTILIZER AND MULCH

1. SEE PROJECT SWPPP FOR TEMPORARY SEEDING SPECIFICATIONS

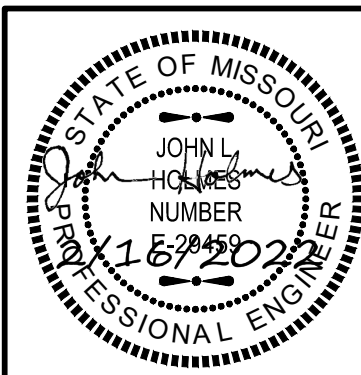


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MISSOURI STATE CERTIFICATE  
OF AUTHORITY #2007004004

REUSE OF THIS DRAWING IN ANY MANNER IS  
STRICTLY PROHIBITED WITHOUT THE WRITTEN  
APPROVAL OF  
ALLSTATE CONSULTANTS, LLC

## PROPOSED KETTLE CREEK RESTORATION TRAGER QUARRY-NETTLETON CALDWELL COUNTY, MISSOURI



### DATE

9-29-2021

### REVISED:

- 12-14-2021
- 02-16-2022

### JOB NUMBER

20223.01

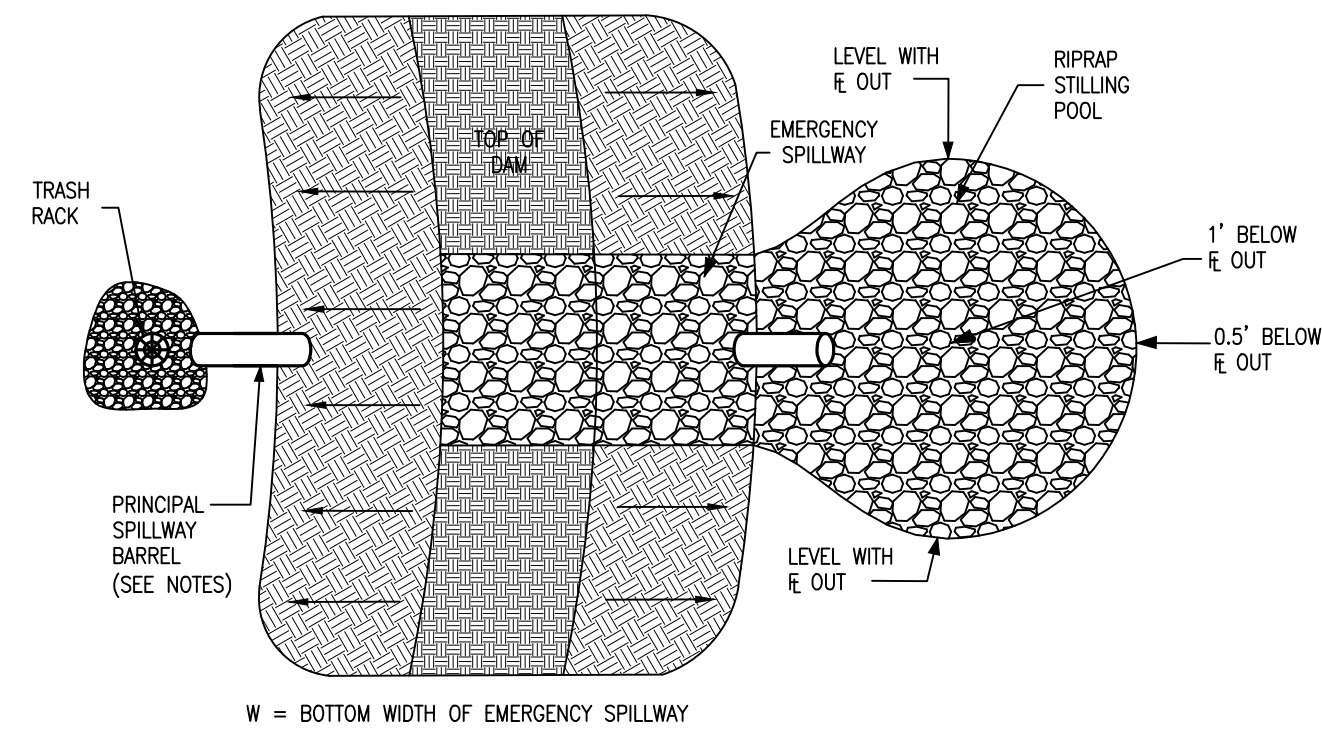
### SCALE

1"=100' H 1"=10' V

### SHEET

1





#### NOTES

- 1) PERFORATED RISER – THE SEDIMENT BASIN POOL SHALL BE DRAINED BY USING A PERFORATED RISER OR BY SOME OTHER APPROVED MEANS. TO IMPROVE THE EFFICIENCY OF THE PRINCIPAL SPILLWAY SYSTEM, MAKE THE DIAMETER OF THE RISER AT LEAST 1.25 TIMES THAT OF THE BARREL. THE RISER SHALL BE PERFORATED WITH 1/2 – INCH DIAMETER HOLES SPACED 8 INCHES VERTICALLY AND 10-12 INCHES HORIZONTALLY. COVER THE PERFORATED SECTION OF THE RISER WITH 2 FEET OF 1/2 – 3/4 INCH CLEAN GRAVEL.
- 2) ANTI-VORTEX DEVICE AND TRASH RACK – AN ANTI-VORTEX DEVICE AND TRASH RACK SHALL BE SECURELY INSTALLED ON TOP OF THE RISER. AN APPROVED ANTI-VORTEX DEVICE IS A RIGID VERTICAL PLATE FIRMLY ATTACHED TO THE PIPE AND ORIENTED NORMAL TO THE CENTERLINE OF DAM. THE PLATE DIMENSIONS SHALL BE: LENGTH = DIAMETER OF THE RISER PLUS 12 INCHES; HEIGHT = DIAMETER OF THE BARREL. ANOTHER APPROVED DEVICE IS THE CONCENTRIC COVER TRASH RACK WHICH ALSO FUNCTIONS AS AN ANTI-VORTEX DEVICE.
- 3) BASE – THE BOTTOM OF THE RISER SHALL BE LOCATED AT THE LOW POINT IN THE BASIN TO INSURE COMPLETE DRAINAGE. THE RISER SHALL HAVE A BASE ATTACHED WITH A WATERTIGHT CONNECTION AND SHALL HAVE SUFFICIENT WEIGHT TO PREVENT FLOTATION OF THE RISER. TWO APPROVED BASES ARE: (1) A CONCRETE BASE 18" THICK WITH THE RISER IMBEDDED 6" IN THE BASE; (2) A 3/4" MINIMUM THICKNESS STEEL PLATE WITH CONTINUOUS WELD ALL AROUND THE BASE OF THE RISER TO FORM A WATERTIGHT CONNECTION. THE PLATE SHALL HAVE 2 FEET OF STONE, GRAVEL, OR TAMPED EARTH PLACED ON IT TO PREVENT FLOTATION. IN EITHER CASE, EACH SIDE OF THE SQUARE BASE SHALL BE TWICE THE RISER DIAMETER.
- 4) ANTI-SEEP COLLARS – ANTI-SEEP COLLARS SHALL BE INSTALLED AROUND THE PIPE CONDUIT WITHIN THE NORMAL SATURATION ZONE TO INCREASE THE SEEPAGE LENGTH.  
  
THE ANTI-SEEP COLLAR AND ITS CONNECTION TO THE PIPE SHALL BE WATERTIGHT. THE MAXIMUM SPACING SHALL BE APPROXIMATELY 14 TIMES THE MINIMUM PROJECTION OF THE COLLAR MEASURED PERPENDICULAR TO THE PIPE.
- 5) OUTLET PROTECTION – PROTECTION AGAINST SCOUR AT THE DISCHARGE END OF THE PIPE SPILLWAY SHALL BE PROVIDED.

#### SEDIMENT BASIN N.T.S.

#### SEDIMENT BASIN CONSTRUCTION SPECIFICATIONS

- 1) SITE PREPARATIONS – CLEAR, GRUB, AND STRIP TOPSOIL FROM AREAS UNDER THE EMBANKMENT TO REMOVE TREES, VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL. TO FACILITATE SEDIMENT CLEANSOUT AND RESTORATION, CLEAR THE POOL AREA OF ALL BRUSH, TREES, AND OTHER OBJECTIONABLE MATERIALS. STOCKPILE ALL TOPSOIL OR SOIL CONTAINING ORGANIC MATTER FOR USE ON THE OUTER SHELL OF THE EMBANKMENT TO FACILITATE VEGETATIVE ESTABLISHMENT. PLACE TEMPORARY SEDIMENT CONTROL MEASURES BELOW THE BASIN AS NEEDED.
- 2) CUT-OFF TRENCH – EXCAVATE A CUT-OFF TRENCH ALONG THE CENTERLINE OF THE EARTH FILL EMBANKMENT. CUT THE TRENCH TO STABLE SOIL MATERIAL, BUT IN NO CASE MAKE IT LESS THAN 2 FEET DEEP. THE CUT-OFF TRENCH MUST EXTEND INTO BOTH ABUTMENTS TO AT LEAST THE ELEVATION OF THE RISER CREST. MAKE THE MINIMUM BOTTOM WIDTH WIDE ENOUGH TO PERMIT OPERATION OF EXCAVATION AND COMPACTION EQUIPMENT BUT IN NO CASE LESS THAN 2 FEET. MAKE SIDE SLOPES OF THE TRENCH NO STEEPER THAN 1:1. COMPACTION REQUIREMENTS ARE THE SAME AS THOSE FOR THE EMBANKMENT. KEEP THE TRENCH DRY DURING BACKFILLING AND COMPACTION OPERATIONS.
- 3) EMBANKMENT – FILL SHOULD BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, ROCKS, AND OTHER OBJECTIONABLE MATERIAL. SCARIFY AREAS ON WHICH FILL IS TO BE PLACED BEFORE PLACING FILL. THE FILL MATERIAL MUST CONTAIN SUFFICIENT MOISTURE SO IT CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN 6 TO 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL AREA AND THEN COMPACT IT. COMPACTION MAY BE OBTAINED BY ROUTING THE CONSTRUCTION HAULING EQUIPMENT OVER THE FILL SO THAT THE ENTIRE SURFACE OF EACH LAYER IS TRAVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE HEAVY EQUIPMENT, OR A COMPACTOR MAY BE USED. CONSTRUCT THE EMBANKMENT TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLING.
- 4) CONDUIT SPILLWAYS – SECURELY ATTACH THE RISER TO THE BARREL OR BARREL STUB TO MAKE A WATERTIGHT STRUCTURAL CONNECTION. SECURE ALL CONNECTIONS BETWEEN BARREL SECTIONS BY APPROVED WATERTIGHT ASSEMBLIES. PLACE THE BARREL AND RISER ON A FIRM, SMOOTH FOUNDATION OF IMPERVIOUS SOIL. DO NOT USE PERVIOUS MATERIAL SUCH AS SAND, GRAVEL, OR CRUSHED STONE AS BACKFILL AROUND THE PIPE OR ANTI-SEEP COLLARS. PLACE THE FILL MATERIAL AROUND THE PIPE SPILLWAY IN 4-INCH LAYERS AND COMPACT IT UNDER AND AROUND THE PIPE TO AT LEAST THE SAME DENSITY AS THE ADJACENT EMBANKMENT. CARE MUST BE TAKEN NOT TO RAISE THE PIPE FROM FIRM CONTACT WITH ITS FOUNDATION WHEN COMPACTING UNDER THE PIPE HAUNCHES.  
  
PLACE A MINIMUM DEPTH OF 2 FEET OF HAND-COMPACTED BACKFILL OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT. ANCHOR THE RISER IN PLACE BY CONCRETE OR OTHER SATISFACTORY MEANS TO PREVENT FLOTATION. IN NO CASE SHOULD THE PIPE CONDUIT BE INSTALLED BY CUTTING A TRENCH THROUGH THE DAM AFTER THE EMBANKMENT IS COMPLETE.
- 5) INLETS – DISCHARGE WATER INTO THE BASIN IN A MANNER TO PREVENT EROSION. USE DIVERSIONS WITH OUTLET PROTECTION TO DIVERT SEDIMENT-LADEN WATER TO THE UPPER END OF THE POOL AREA TO IMPROVE BASIN TRAP EFFICIENCY.
- 6) EROSION CONTROL – CONSTRUCT THE STRUCTURE SO THAT THE DISTURBED AREA IS MINIMIZED. DIVERT SURFACE WATER AWAY FROM BARE AREAS. COMPLETE THE EMBANKMENT BEFORE THE AREA IS CLEARED. STABILIZE THE EMERGENCY SPILLWAY EMBANKMENT AND ALL OTHER DISTURBED AREAS ABOVE THE CREST OF THE PRINCIPAL SPILLWAY IMMEDIATELY AFTER CONSTRUCTION.

#### EROSION CONTROL NOTES

1. DENOTES FABRIC OR MULCH SEDIMENT BARRIER.
2. DENOTES DIVERSION BERM AND DIRECTION OF FLOW.
3. NATURAL GROUND COVER WILL BE MAINTAINED WHERE POSSIBLE.
4. EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL A NEW STORMWATER PLAN IS IMPLEMENTED.
5. EROSION CONTROL STRUCTURES SHOULD BE FIELD MODIFIED TO ACCOMPLISH DESIRED RESULTS.
6. THIS PLAN SHALL BE AMENDED AND UPDATED AS APPROPRIATE, AT A MINIMUM, WHENEVER THE: 1) DESIGN, OPERATIONS, OR MAINTENANCE OF BMP'S IS CHANGED; 2) OPERATION OF THE QUARRY IS CHANGED AND SIGNIFICANTLY AFFECTS THE QUALITY OF THE STORM WATER DISCHARGES; 3) PERMITTEE'S INSPECTIONS INDICATE DEFICIENCIES IN THE PLAN OR ANY BMP'S; AND/OR 4) THE MISSOURI DEPARTMENT OF NATURAL RESOURCES NOTIFIES THE PERMITTEE OF DEFICIENCIES IN THIS PLAN.
7. BERMS, SEDIMENT BARRIERS AND SEDIMENT BASINS SHALL BE INSPECTED ON A REGULAR SCHEDULE AND WITHIN A REASONABLE TIME PERIOD (NOT TO EXCEED 48 HOURS) FOLLOWING HEAVY RAINS. REGULAR SCHEDULED INSPECTIONS SHALL BE AT A MINIMUM OF ONCE PER WEEK. ANY DEFICIENCIES SHALL BE NOTED IN A WEEKLY REPORT OF THE INSPECTION AND CORRECTED WITHIN SEVEN CALENDAR DAYS OF THE REPORT.
8. SEE SWPPP FOR ADDITIONAL DETAIL.

#### ENVIRONMENTAL STATEMENTS

1. SUBSTANCES REGULATED BY FEDERAL LAW UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) OR THE COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA) WHICH ARE TRANSPORTED, STORED OR USED FOR MAINTENANCE, CLEANING OR REPAIRS SHALL BE MANAGED ACCORDING TO THE PROVISIONS OF RCRA AND CERCLA.
2. ALL PAINTS, SOLVENTS, PETROLEUM PRODUCTS AND PETROLEUM WASTE PRODUCTS (EXCEPT FUELS) AND STORAGE CONTAINERS (SUCH AS DRUMS, CANS OR CARTONS) SHALL BE STORED SUCH THAT THESE MATERIALS ARE NOT EXPOSED TO STORM WATER. SUFFICIENT PRACTICES OF SPILL PREVENTION, CONTROL AND/OR MANAGEMENT SHALL BE PROVIDED TO PREVENT ANY SPILLS OF THESE POLLUTANTS FROM ENTERING A WATER OF THE STATE. ANY CONTAMINANT SYSTEM USED TO IMPLEMENT THIS REQUIREMENT SHALL BE CONSTRUCTED OF MATERIALS COMPATIBLE WITH THE SUBSTANCES CONTAINED AND SHALL ALSO PREVENT THE CONTAMINATION OF GROUNDWATER.
3. THE APPLICANT SHALL NOTIFY BY TELEPHONE AND IN WRITING THE DEPARTMENT OF NATURAL RESOURCES, WATER POLLUTION CONTROL PROGRAM, POST OFFICE BOX 176, JEFFERSON CITY, MO 65102, 1-800-361-4827, OF ANY OIL SPILLS OR IF HAZARDOUS SUBSTANCES ARE FOUND DURING THE PROSECUTION OF WORK UNDER THIS PERMIT.

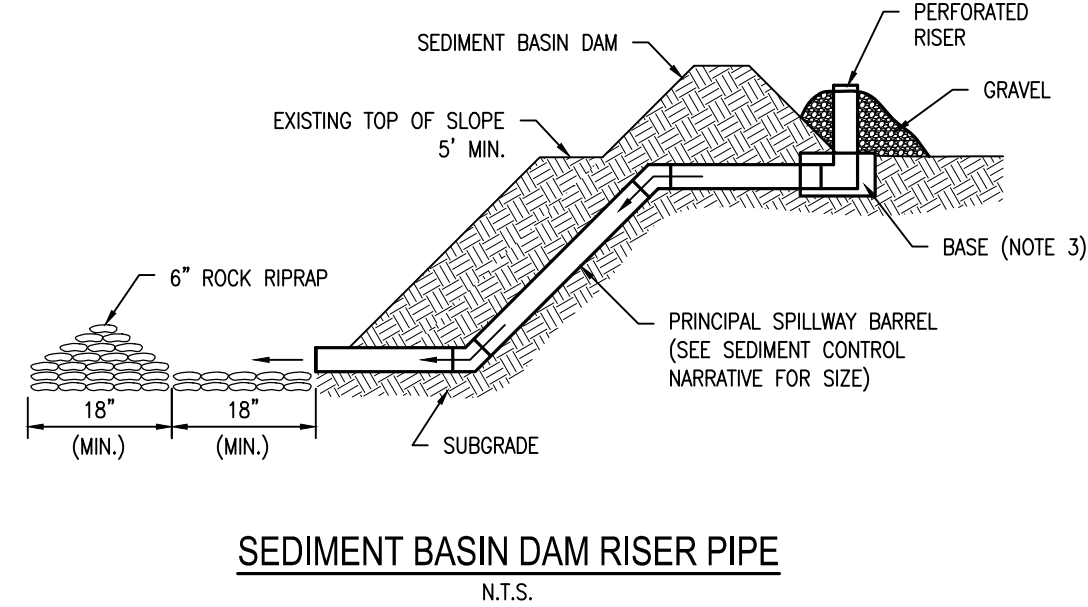
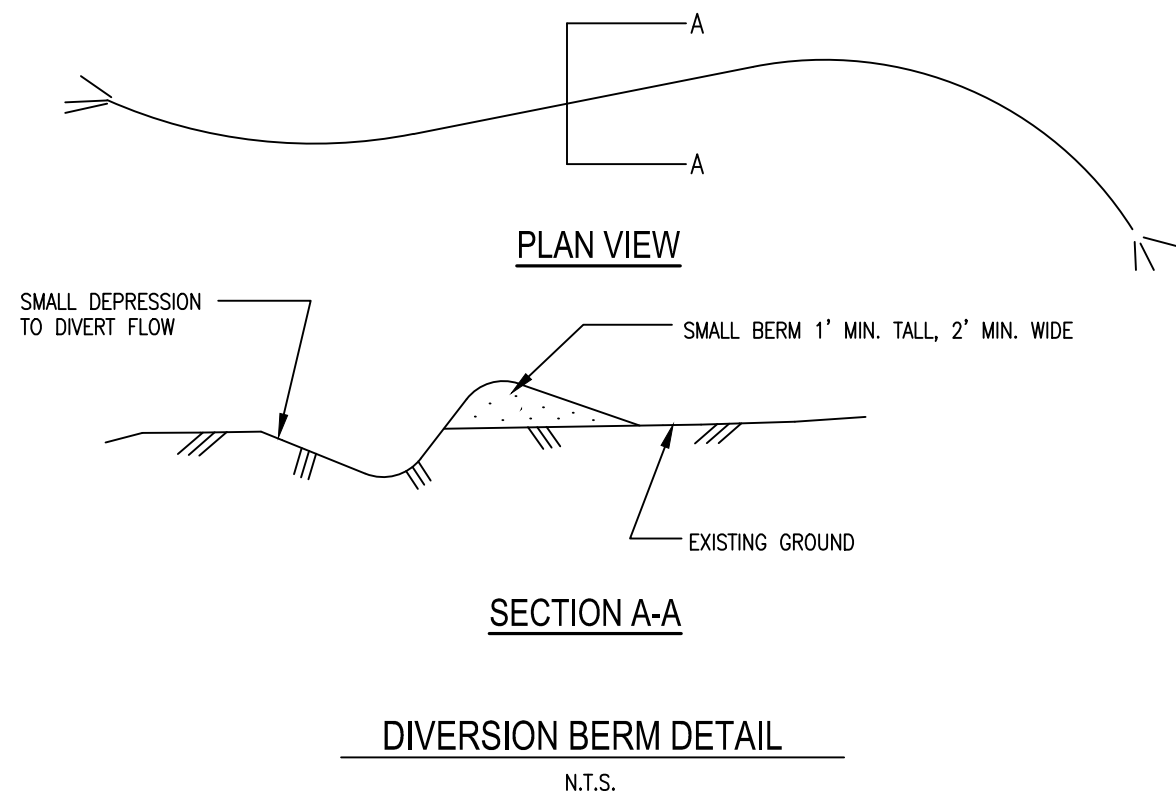
#### SEDIMENT CONTROL NARRATIVE

1. THE PROPOSED PLAN WILL UTILIZE SEDIMENT BASINS AND DIVERSION BERMS.
2. HYDRAULIC CALCULATIONS BASED ON DIVISION V, APWA SECTION 5100EROSION AND SEDIMENT CONTROL – SEPTEMBER 2010.

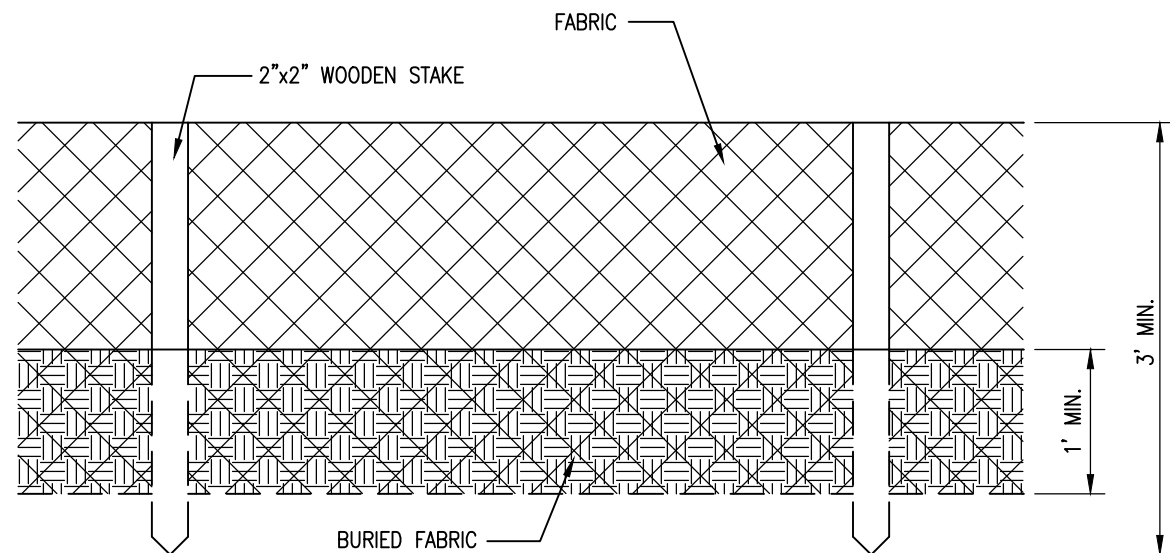
SEDIMENT BASIN A  
Q = CIA C = 0.4  
I = 7.0 in/hr (Ic = 5 min, 5 yr RETURN PERIOD)  
A = 6.07 ac  
Q = (0.4)(7.0)(6.07) = 17 cfs  
SURFACE AREA = 1000 S.F. x (6.07 ac/1 ac da) = 6,070 s.f. (0.14 acres)  
VOLUME = 3600 x (6.07 ac)(1 ac da) = 21,852 cf  
PRINCIPAL OUTLET: 24" BARREL (TOP OF STAND PIPE = 4' ABOVE UPSTREAM BARREL INVERT)  
SPILLWAY: 20' FLAT BOTTOM DITCH W/4:1 SLOPES @ 1.0% 1.0' DEEP (E=4' ABOVE BARREL INVERT)  
TOP OF DAM: MINIMUM 8' WIDE (ELEV.=5' ABOVE UPSTREAM BARREL INVERT)

SEDIMENT BASIN B  
Q = CIA C = 0.4  
I = 7.00 (Ic = 5 min, 5 yr RETURN PERIOD)  
A = 2.5 ac  
Q = (0.4)(7.0)(2.5) = 7.0 cfs  
SURFACE AREA = 1000 S.F. x (2.5 ac/1 ac da) = 2,500 s.f. (0.06 acres)  
VOLUME = 3600 x (2.5 ac)(1 ac da) = 9,000 cf  
PRINCIPAL OUTLET: 15" BARREL (TOP OF STAND PIPE = 4' ABOVE UPSTREAM BARREL INVERT)  
SPILLWAY: 10' FLAT BOTTOM DITCH W/4:1 SLOPES @ 1.0% 1.0' DEEP (E=4' ABOVE BARREL INVERT)  
TOP OF DAM: MINIMUM 8' WIDE (ELEV.=5' ABOVE UPSTREAM BARREL INVERT)

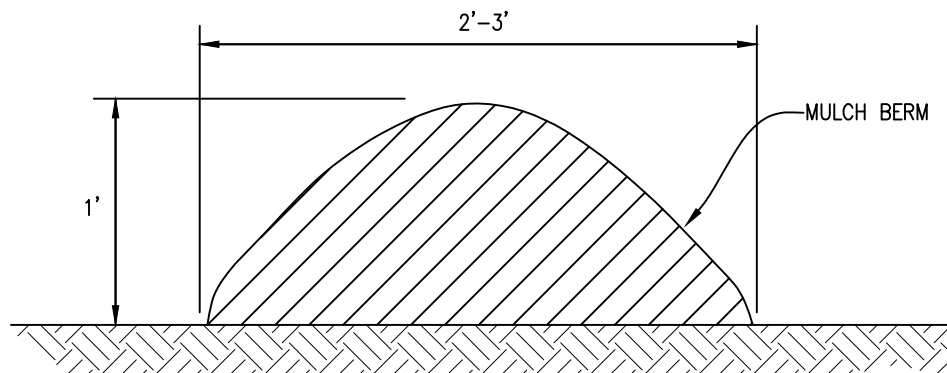
3. OWNER SHALL MONITOR SILT LEVELS AND EROSION CONTROL STRUCTURES TO ENSURE PROPER MAINTENANCE. PERIODIC CLEANING WILL BE NECESSARY.
4. BERMS, SEDIMENT BASINS, AND SEEDING AND MULCHING WERE CHOSEN BASED ON SITE TOPOGRAPHY AND DRAINAGE AREAS.
5. THE PROPERTY OWNER SHALL ROUTINELY INSPECT ALL EROSION CONTROL STRUCTURES FOR CONDITION AND EFFECTIVENESS. FAILING STRUCTURES SHALL BE ADJUSTED OR RECONSTRUCTED. ALL EROSION CONTROL MEASURES SHALL COMPLY WITH THE QUARRY SWPPP.



#### SEDIMENT BASIN DAM RISER PIPE N.T.S.



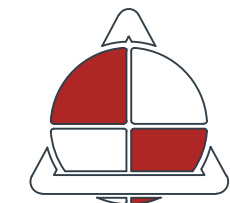
#### SILT FENCE INSTALLATION N.T.S.



#### MULCH BERM NOTES:

1. MULCH BERMS MAY BE USED IN PLACE OF SILT FENCE.
2. THE EROSION CONTROL BERM SHALL BE PLACED, UNCOMPACTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE CITY. BERM SHALL CONSIST OF COMPOST BERM OR SHREDDED MULCH BERM. SHREDDED MULCH FROM TREE REMOVAL ON PROJECT IS ACCEPTABLE.
3. IF COMPOST, SEED WITH ANNUAL RYE IMMEDIATELY UPON PLACEMENT.
4. DO NOT USE MULCH BERMS IN ANY RUNOFF CHANNELS.
5. PLACE BERMS ON DENUDED AREAS AS SOON AS POSSIBLE. MULCH/COMPOST AND/OR TEMPORARY OR PERMANENT VEGETATION SHALL BE APPLIED/ESTABLISHED ABOVE THE MULCH BERMS WHEN NECESSARY FOR ADDITIONAL EROSION CONTROL.
6. WHEN SEDIMENT FILLS THE AREA BEHIND THE MULCH BERM TO 1/2 THE HEIGHT OF THE MULCH BERM, THE CONTRACTOR SHALL REMOVE THE SEDIMENT AND PLUGGED MULCH AND RESHAPE BERM WITH CLEAN MULCH AS NEEDED.
7. WATER FROM TRENCH DEWATERING TO BE PUMPED BEHIND COMPOST BERM OR WATTLE TO BE FILTERED.

#### MULCH BERM N.T.S.

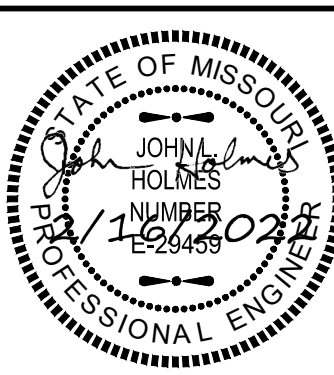


**ALLSTATE  
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MISSOURI STATE CERTIFICATE  
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ALLSTATE CONSULTANTS LLC

PROPOSED KETTLE CREEK RESTORATION  
TRAGER QUARRY-NETTLETON  
CALDWELL COUNTY, MISSOURI



#### DATE

9-29-2021

#### REVISED:

02-16-2022

#### JOB NUMBER

20223.01

#### SCALE

N.T.S.

#### SHEET

2



**APPENDIX B**  
**INSPECTION FORMS**

**STORMWATER MANAGEMENT  
SITE INSPECTION FORM**

Inspector Name/Title: \_\_\_\_\_ Date \_\_\_\_\_

Project Name \_\_\_\_\_

Project Number: \_\_\_\_\_ Client \_\_\_\_\_

Contractor \_\_\_\_\_

Has there been any Precipitation in the past 7 days? \_\_\_\_\_ Yes \_\_\_\_\_ No  
If so, describe, as well as current weather conditions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Do any BMP's need maintenance or attention? \_\_\_\_\_ Yes \_\_\_\_\_ No

Describe any deficiencies and measures taken to correct them:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Are there any areas where land disturbance operations have temporarily or permanently stopped? \_\_\_\_\_ Yes \_\_\_\_\_ No

Are there major grading activities taking place on site? \_\_\_\_\_ Yes \_\_\_\_\_ No

Note any changes that will be made to the SWPPP:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Location of pollutant discharge/ additional concerns or comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SIGNATURE OF INSPECTOR \_\_\_\_\_

**STORMWATER MANAGEMENT  
SITE INSPECTION FORM  
EXPANDED**

The deficiencies present and corrective measures taken to increase the effectiveness of BMP's at \_\_\_\_\_ are as follows:

**SILT FENCE:**

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**EARTH DIKES/DIVERSION BERMS:**

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**SEDIMENT TRAPS/ROCK CHECKS:**

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**PIPE SLOPE DRAINS**

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**DRAINAGE SWALE:**

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**SEDIMENT BASIN:**

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**BUFFER STRIPS/VEGETATIVE BYWAYS:**

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***CRITICAL AREAS THAT NEED TO BE MONITORED:***

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**APPENDIX C**  
**SPILL REPORT FORM**

**Procedures for Determining if a Hazardous  
Material Spill is a Reportable Quantity**

- 1) First determine the type and quantity of material that has been spilled.
- 2) Obtain a material safety data sheet (MSDS) for the spilled material and determine whether any of the constituents are listed in Table 302.4 in 40 CFR 302.
- 3) If none of the constituents in the spilled material are listed in the table (excluding ethylene glycol), the spill is not reportable.
- 4) If the constituents in the spilled material are listed in the table, use the following equation to determine the pounds of material spilled:

$$\text{Pounds Spilled} = (V) (Wt\%) (Sg) (0.0834)$$

Where:

V = Volume of the material spilled, in gallons

Wt% = The weight percent of the constituents in the spilled material (see the MSDS)

Sg = Specific gravity of spilled material (see MSDS)

For Example:

V = 7 Gallons

Wt% = 1.04

Sg = 1.04

$$\text{Pounds Spilled} = (7) (3.5) (1.04) (0.834) = 2.13 \text{ pounds}$$

- 5) If, based on the calculation, the pounds spilled are Greater than the Final RQ (reportable quantity) value listed in Table 302.4 of 40 CFR 302 or the State's reportable quantity minimum amount, the spill must be reported to the appropriate federal, state, and local agencies.

**Storm Water Pollution Prevention Plan**

**Spill Report Form**

Spill Reported By: \_\_\_\_\_  
Name Phone Number

Date Reported: \_\_\_\_\_ Time: \_\_\_\_\_

Date of Spill: \_\_\_\_\_ Time: \_\_\_\_\_

Name of Facility: \_\_\_\_\_

Legal Description: \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4 SEC \_\_\_\_\_, TWP \_\_\_\_\_, Range \_\_\_\_\_,  
County \_\_\_\_\_

Describe Spill Location and Events Leading to Spill: \_\_\_\_\_

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Material Spilled: \_\_\_\_\_

Source of Spill: \_\_\_\_\_

Amount Spilled (Gallons or Pounds)- \_\_\_\_\_

Amount Spilled to Waterway (Gallons or Pounds): \_\_\_\_\_

Nearest Municipality: \_\_\_\_\_

Containment or Cleanup Action: \_\_\_\_\_

---

List Environmental Damage (fish kill, etc.) \_\_\_\_\_



List Injuries or Personal Contamination: \_\_\_\_\_

\_\_\_\_\_

Date and Time Cleanup Completed or Terminated: \_\_\_\_\_

If Cleanup Delayed, Nature and Duration of Delay: \_\_\_\_\_

Description of Materials Contaminated: \_\_\_\_\_

\_\_\_\_\_

Approximate Depth of Soil Excavation: \_\_\_\_\_

Action To Be Taken to Prevent Future Spills: \_\_\_\_\_

\_\_\_\_\_

Agencies Notified:

Local: \_\_\_\_\_ Date: \_\_\_\_\_

State: \_\_\_\_\_ Date: \_\_\_\_\_

Federal: \_\_\_\_\_ Date: \_\_\_\_\_

Signed: \_\_\_\_\_

Contractor Superintendent or  
Environmental Inspector

## Table of Common Hazardous Materials Reportable Quantities

Hazardous Substance	CASRN	Statutory Codedagger	RCRA Waste #	Final RQ Pounds (Kg)
Acetic Acid	64-19-7	1		5000 (2270)
Acetone	67-64-1	4	U002	5000 (2270)
Aluminum Sulfate	10043-01-3	1		5000 (2270)
Ammonia	7664-41-7			100 (45.4)
Arsenic	1327-53-3	1,4	PO11	1 (0.454)
Chlorine	7782-50-5	1,3		10 (4.54)
Chloroform	67-66-3	1,2,3,4	UO44	10 (4.54)
Creosote	N.A.	4	UO51	1 (0.454)
Cupric Sulfate	7758-98-7	1		10 (4.54)
Diazanone	333-41-5	1		1 (0.454)
Ethanal	75-07-0	1,3,4	UOO1	1000 (454)
Ethyl Chloride	75-00-3	2,3		1000 (454)
Ethylene Glycol	107-21-1	3		5000 (2270)
Fluorine	7782	4	PO56	10 (4.54)
Hydrochloric Acid	7647-01-0	1,3		5000 (2270)
Lead	7439-92-1	2		10 (4.54)
Lindane	58-89-9	1,2,3,4	U129	1 (0.454)
Mercury	7439-97-6	2,3,4	U151	1 (0.454)
Phosphoric Acid	7664-38-2	1		5000 (2270)
Phosphorus	7723	1,3		1 (0.454)
Potassium Permanganate	7722-64-7	1		1000 (454)
Propane	96-12-8	4	U194	5000 (2270)
Sodium Hydroxide	1310-17-2	1		1000 (454)
Sodium Hypochlorite	7681-52-9	1		100 (45.4)
Vinyl Chloride	75-01-4	2,3,4	U239	100 (45.4)

**APPENDIX D  
DESCRIPTION OF  
IMPLEMENTED BMP'S**

## Temporary Seeding

### Practice Description Recommended

The establishment of fast-growing annual vegetation to provide economical erosion control for up to 12 months and reduce the amount of sediment moving off the site. Annual plants which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover.

This practice applies where short-lived vegetation can be established before final grading or in a season not suitable for permanent seeding. It helps prevent costly maintenance operations on other erosion control systems such as sediment basin clean-out. Temporary or permanent seeding is necessary to protect earthen structures such as dikes, diversions, and the banks and dams of sediment basins.

### Minimum Requirements

Prior to start of construction, plant materials, seeding rates and times should be specified by a qualified professional. Plans and specifications should be referred to by field personnel throughout the construction process. To ensure emergence, vigorous growth of seedlings and continued plant growth, prepare seedbed, add lime and fertilizer according to soil tests, mulch all but the most ideal sites and follow seeding dates.

- **Seedbed Preparation:** Loosen soil to depth of 3 inches for broadcast seeding or drilling. If compacted, loosen soils for no till drilling. Avoid excessively wet conditions.
- **Amendments:** Fertilizer and lime (if soil pH is less than 5.3) incorporated 3 to 6 inches into the soil. See Table 5.1.
- **Seed Quality:** Certified seed, tested within the past 9 months
- **Plants:** Recommended temporary erosion control plant species. Rate of application and seeding dates are listed in Tables 5.2 and 5.3.
- **Mulch:** 75% of the ground surface should be covered with approved mulching materials (See *Mulching*). Mulching is critical for the less than ideal situations found on development sites.
- **General:** Inspect seeded areas 2 to 4 weeks after seeding for establishment, erosion control and weed control. Repair and reseed as necessary.
- **Reseed:** After 1 year if site is not in permanent vegetation

### Installation

Successful vegetative establishment is directly dependent on the nutrients in the soil. For optimum results, take soil samples from the top 6 inches in each area to be seeded. Submit samples to a soil testing laboratory for liming and fertilizer amendment recommendations.

### Seedbed Preparation

Seedbed preparation is essential for the seed to germinate and grow. For broadcast seeding and drilling, loosen the soil to a depth of approximately 3 inches. For no-till drilling, the soil surface does not need to be

loosened unless the site has surface compaction. Use a disk, ripper, chisel, harrow or other acceptable tillage equipment to loosen compacted, hard or crusted soil surfaces. Avoid preparing the seedbed under excessively wet conditions.

## Liming

Acid soils with an extremely low pH can prevent seeding success. Most of the recommended temporary vegetation is tolerant of low pH soils and will establish on all but the lowest pH soils. If soil pH in the region is known to be extremely low, **conduct a soil pH test** to determine if limestone is necessary for temporary seeding. Amend soils with lime according to information in Table 5.1. Soils with a pH above 7.0 should not be limed.

**Table 5.1 Liming Requirements for Temporary Sites**

pH Test	Plant Response	Recommended Application of Agricultural Limestone
below 6.0	poor growth	lime according to soil test
6.0 - 6.5	adequate growth	no lime recommended
greater than 6.5	greater than 6.5	no lime recommended

## Fertilizer

Subsoil will most likely be deficient in nutrients required for growth. A **soil test will provide the best guide** for the amount and types of fertilizer to apply for optimum plant growth. A general recommendation is to broadcast 90 lbs. of **actual** N-P-K per acre for areas receiving more than 30 inches of precipitation and 50 lbs. of N-P-K per acre in areas receiving less than 30 inches of precipitation.\* For best results incorporate the fertilizer into the top 3 to 6 inches before seeding.

\* For example, to compute the bulk pounds of product to use  
$$\frac{\text{Actual \# Needed}}{\% \text{ Available}} \quad \text{or} \quad \frac{90\#}{28\%} = 321\# \text{ Bulk}$$

## Seeding

Apply seed evenly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. Plant small grains no more than 1 1/2 inches deep. Plant grasses and legumes no more than 1/2 inch deep. Prior to mulching, harrow, rake or drag a chain to lightly incorporate broadcast seed and enhance germination. Cover broadcast or drilled seed with mulch (See *Mulching*). On bare soils, firm lightly with a roller or a cultipacker.

Table 5.2 Temporary Seeding Plant Materials and Minimum Seeding Rate \*

Species	Seeding Rates		Plant characteristics
	lbs. per Acre	lbs. per 1,000 sq.ft.	
Oats	80	2	not cold tolerant, height up to 2 feet
Cereals:Rye/Wheat	90 / 120	2.0 / 2.5	cold tolerant, height up to 3 feet, low pH tolerant
Millet, Sudan grass	45 / 60	1.0 / 1.25	warm season annual, aggressive growth, height up to 5 feet
Annual Ryegrass	75	2	may be added to mix, not heat tolerant, height up to 16 inches
Annual Lespedeza** plus Tall Fescue	15 plus 45	0.5 plus 1.0	warm season annual legume, makes own nitrogen, tolerates low pH

\* In areas receiving less than 30 inches of precipitation, use 75 percent of these rates.

\*\* If there is any possibility that the seeding will be required to control erosion for more than one year, then consider the addition of fescue or another permanent species as part of a mixture when seeding.

## Planting Dates

Plant according to the design plan. In absence of a plan, choose a recommended temporary species or mixture appropriate for the season from Tables 5.2 and 5.3. Plant during optimum seeding dates if at all possible. Use mulch if planting during acceptable seeding dates. Roll and cultipack broadcast seed for good soil-to-seed contact. Use high quality seed. For best results use certified seed. When using uncertified seed, use the highest recommended seeding rate.

Table 5.3 Seeding Dates for Temporary Seedings

Species	Seeding Dates Optimum & Acceptable											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oats												
Cereals:Rye/Wheat												
Millet, Sudan grass												
Annual Ryegrass												
Annual Lespedeza** plus Tall Fescue												

1- if site may not be developed within one year, consider permanent species

### Table Key:

Optimum Seeding Dates	
Acceptable Seeding Dates	

## **Mulching**

Mulching is recommended to conserve moisture and reduce erosion. Evenly cover 75% of the ground surface with mulch material specified in the design plan. Tack or tie down according to plan (See *Mulching*).

**Construction Verification** Check materials and installation for compliance with specifications.

**Troubleshooting:** Consult with a qualified design professional if the following occurs:

- Design specifications for seed variety, seeding dates or mulching cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

## **Maintenance**

Check temporary seedings within 2 to 4 weeks of planting to see if stands are of adequate thickness (more than 30% of the ground surface covered). Stands should be uniform and dense for best results. Fertilize, reseed and mulch bare and sparse areas immediately to prevent erosion. Mowing is not recommended for cereals seeded alone. Cereals seeded with a grass can be mowed when height is greater than 12 inches. However, to prevent damage to grasses, do not mow shorter than 4 inches. Millets and sudangrass should be mowed before height is greater than 6 inches to allow regrowth and continued erosion protection. Annual lespedeza and tall fescue may be mowed after height exceeds 8 inches. Do not mow shorter than 4 inches. Replant temporary or permanent vegetation within 12 months as annual plants die off and no longer provide erosion control. Consider no-till planting where possible.

## **Common Problems**

Inadequate seedbed preparation; causes poor seedling emergence and growth—repair gullies, prepare seedbed, fertilize, lime (if necessary), mulch and reseed. Unsuitable choice of plant materials; resulting in poor germination or inadequate stand (less than 30% of the ground surface covered)—choose plant materials appropriate for season, prepare seedbed and replant. Inadequate mulching; resulting in poor or spotty stands—cover area evenly and tack or tie down mulch properly, especially on slopes, ridges and in channels.

Lack of nitrogen; causes poor plant vigor, yellow color and short height—add 50 lbs. of nitrogen fertilizer per acre. Do not apply over the top of existing plants from June 1 to August 15 or on frozen ground. Dying plants; usually caused by soil compaction that limits root growth and water availability to plants—loosen soil if reseeding is necessary or before seeding permanent vegetation.

## Detention Ponds and Basins

### Practice Description

A dam designed to hold stormwater runoff and release the water slowly to prevent downstream flooding and stream erosion. Detention ponds and basins are an extremely effective water quality control measure and significantly reduce the frequency of erosive floods downstream. Ideally, a detention pond will store at least the first 1/2 inch of runoff from the design storm and release the remainder at the predevelopment rate. Their usage is best suited to larger, more intensively developed sites of over 20 acres.

Regular detention ponds have less storage and different outlet conduits than extended detention ponds. Both can have permanent pools of water or be designed as dry basins. Both can be designed to hold sediment.

### Recommended Minimum Requirements

Prior to start of construction, detention ponds should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process. The detention pond should be built according to the planned grades and dimensions.

- **Drainage Area:** 20 to 50 acres
- **Structure Life:** 10 years or more
- **Detention:** 24 to 48 hour detention of runoff from the design storm
- **Trap efficiency:** The length to width ratio of the basin should be 2:1 or greater; 5:1 is optimal to capture fine sediments. Inlet: Locate as far upstream as possible from the outlet. Collector Channels: Leading to the detention pond should be constructed of riprap, concrete or paved material to route water to the detention pond.
- **Anti-seep Devices:** Either of the following is recommended:
  - At least two watertight anti-seep collars should be used around the outlet conduit; collars should project 1 to 3 feet from the pipe, or
  - a sand diaphragm
- **Embankment Slopes:** 2.5:1 or flatter; 3:1 where maintained by tractor or other equipment.
- **Basin Slopes:** No steeper than 3:1 and no flatter than 20:1
- **Vegetative Buffer:** A minimum width of 25 feet around the pond
- **Settlement:** Allow for at least 10% of extra fill
- **Site Access:** Reserved for bringing in heavy maintenance equipment and to remove and dispose of sediments



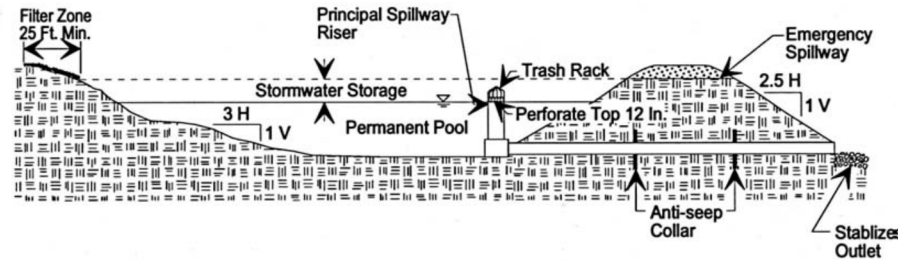


Figure 5.43 Typical Detention Pond

## Construction

### *Site Preparation*

Locate the detention pond as close to the stormwater collection system as possible, considering pool area, dam length and spillway conditions. Locate all underground utilities. Clear, strip and grub the dam location, removing all woody vegetation, rocks and other objectionable material.

Follow all federal, state and local requirements on impoundment sites.

Dispose of trees, limbs, logs and other debris in designated disposal areas.

Excavate the embankment foundation (outlet apron first), stockpiling any surface soil having high amounts of organic matter for later use.

### *Principal Spillway*

Clear the sediment pool to facilitate sediment clean out. Situate the spillway pipe and riser on a firm, even foundation. Prepare the pipe bedding.

Place around the barrel a 4-inch layer of moist, clayey, workable soil (not pervious material such as sand, gravel or silt), and compact with hand tampers to at least the density of the foundation soil. (Don't raise the pipe from the foundation when compacting under the pipe haunches.) Perforate the top 12 inches of the riser with 1/2-inch diameter holes spaced 3 inches apart. Set the top elevation of the riser to allow the detention pond to store the first 1/2 inch of basin runoff in this 12-inch perforated zone, or according to the design plan.

Embed the riser at least 12 inches into concrete (which serves as an anti-flotation block). The weight of the concrete should balance the buoyant force acting on the riser.

$$\text{Buoyant Force} = \text{Volume of Riser} \times 62.4 \text{ lbs/ft}^3$$

Surround the base of the riser with 2 feet of clean uniformly graded stone.

Place a trash rack around the riser inlet. The trash rack should have 4- to 6-inch square openings.

At the pipe outlet, install a riprap or concrete apron at least 5 feet wide and 10 feet long to a stable grade.

Optional: A slotted or V-notch weir, constructed within an open channel spillway, can be used in place of a riser and conduit as a principal spillway.

### ***Embankment***

Scarify the embankment foundation before placing fill.

Use fill from predetermined borrow areas. It should be clean, stable, mineral soil free of organic material, roots, woody vegetation, rocks and other debris; and must be wet enough to form a ball without crumbling, yet not so wet that water can be squeezed out.

Place the most permeable soil in the downstream toe and the least permeable in the center portion of the dam.

Compact the fill material in 6- to 8-inch continuous layers over the length of the dam. (One way is by routing construction equipment over the dam so that each layer is traversed by at least one wheel of the equipment). Tracked construction equipment does not provide adequate compaction.

Protect the spillway barrel with 2 feet of hand tamped, compacted fill before traversing over the pipe with equipment. Place a stake at the height sediment must be cleaned out of the basin (50% of design elevation).

### ***Emergency Spillway***

Construct the spillway in undisturbed soil around one end of the embankment and locate it so that all excess flow will return to the receiving channel without damaging the embankment.

### **Erosion Control**

Stabilize the spillway with vegetation as soon as grading is complete; or install paving material to finished grade if the spillway is not to be vegetated.

Minimize the size of all disturbed areas. At the completion of each phase of construction, vegetate the disturbed areas to minimize erosion.

Use temporary diversions to prevent surface water from running onto disturbed areas.

Divert sediment-laden water to the upper end of the sediment pool to improve trap effectiveness.

Direct all runoff into the pond at low velocity.

Stabilize all disturbed areas (except the lower one-half of the sediment basin) immediately after construction.

### **Safety**

Because detention ponds that impound water are hazardous, the following precautions should be taken:

- Avoid steep slopes; cut and fill slopes should be 2.5:1 or flatter; 3:1 where maintained by tractor or other equipment.
- Fence area and post with warning signs if trespassing is likely.
- Provide a means of dewatering the basin between storm events.

## **Construction Verification**

Check the finished grades and configuration for all earthwork. Check elevations and dimensions of all pipes and structures.

### **Troubleshooting: Consult with registered design professional if the following occurs:**

- Seepage is encountered during construction; it may be necessary to install drains.
- Variations in topography on site indicate detention pond will not function as intended.
- Design specifications for fill, pipe, seed variety or seeding dates cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

## **Maintenance**

Inspect the detention pond after each storm event.

Remove and properly dispose of sediment when it accumulates to one-half the design volume.

Periodically check the embankment, emergency spillway and outlet for erosion damage, piping, settling, seepage or slumping along the toe or around the barrel; and repair immediately.

Remove trash and other debris from the riser, emergency spillway and pool area. Clean or replace the gravel around the riser if the sediment pool does not drain properly. Remove nuisance vegetation on embankment.

Remove rodents that burrow into the dam.

## **Common Problems**

Piping failure along conduit; caused by improper compaction, omission of anti-seep collar, leaking pipe joints or use of unsuitable soil—repair damage, check pipe joints and seal leak if necessary. Use suitable soil for backfill. Consider installing anti-seep collar.

Erosion of spillway or embankment slopes; caused by inadequate vegetation or improper grading and sloping—repair damage and establish suitable grade and/or vegetation.

Slumping and/or settling of embankment; caused by inadequate compaction and/or use of unsuitable soil—excavate failed material and replace with properly compacted suitable soil.

Slumping failure; caused by steep slopes—excavate failed material and replace with properly compacted suitable soil. Consider flattening slope.

Erosion and caving below principal spillway; caused by inadequate outlet protection—repair damaged area and install proper outlet protection.

Basin not located properly for access; results in difficult and costly maintenance—relocate basin to more accessible area or improve access to site.

Sediment not properly removed; results in inadequate storage capacity— remove sediment at regular frequent intervals and after major storms.

Lack of anti-flotation; results in riser damage from uplift—install antiflotation structure.

Lack of trash guard; results in the riser and barrel being blocked with debris—remove blockage and install properly designed trash guard.

Principal and emergency spillway elevations too high relative to top of dam; results in overtopping—lower principal and emergency spillway elevations to decrease overtopping potential.

Sediment disposal area not designated on design plans; results in improper disposal of accumulated sediment—locate acceptable disposal area and indicate location on plans.

Safety and/or health hazard from pond water; caused by gravel clogging the drainage system—clean out clogged drainage system on regular basis.

Principal spillway too small; results in frequent operation of emergency spillway and increased erosion potential—consider increasing capacity of principal spillway, install supplemental spillway or install suitable erosion protection in emergency spillway.

Stormwater released from pond or basin too rapidly; caused by spillway pipe sized too large—consider resizing spillway pipe.

# Riprap-lined Channel

## Practice Description

Waterways with an erosion-resistant rock lining designed to carry concentrated runoff to a stable outlet. This practice applies where conditions are expected to be unsuitable for use of grass-lined channels, such as: 1) channels with average grades over 5%, continuous or prolonged flows occur, potential for damage from traffic exists, or soils are erodible and soil properties are not suitable for vegetation; 2) design velocities exceed 5 feet per second; 3) channel location warrants the use of increased protection; or 4) channel will have prolonged periods of wetness which will hinder growth of grass.

## Recommended Minimum Requirements

Prior to start of construction, riprap-lined channels should be designed by a registered design professional. Plans and specifications should be referred to by field personnel throughout the construction process. The channel should be built according to planned alignment, grade and cross section.

- **Cross Section:** As shown in the design specifications
- **Side Slopes:** 2:1 or flatter
- **Riprap/Rock:** Size and gradation as shown in design specifications. Riprap should consist of a well-graded mixture of stone. Larger stone should predominate, with sufficient smaller sizes to fill the voids between the stones. The diameter of the largest stone size should be not greater than 1.5 times the  $d_{50}$  size.
- **Riprap Thickness:** Minimum thickness of riprap should be 1.5 times the maximum stone diameter.
- **Stone or Rock Quality:** Select stone for riprap from field stone or quarry stone. The stone should be hard, angular, and highly chemical- and weather- resistant. The specific gravity of the individual stones should be at least 2.5.
- **Foundation:** Geotextile filter fabric or rock aggregate filter layer under the riprap
- **Outlet:** Stable, non-erosive

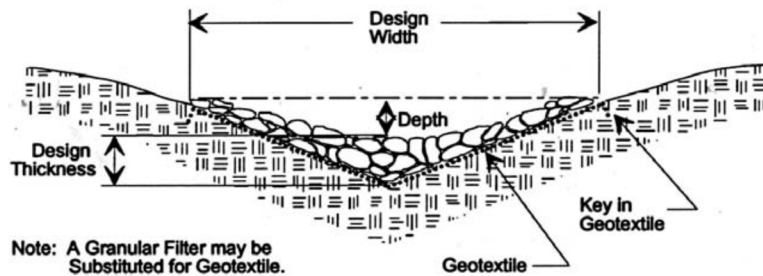


Figure 5.20 Typical V-shaped Riprap-lined Channel

## **Construction**

### **Site Preparation**

Determine exact location of underground utilities.

Remove brush, trees and other debris from the channel and spoil areas, and dispose of properly.

Excavate cross section to the lines and grades shown in design specifications. Over excavate to allow for thickness of riprap and filter material.

### **Installation**

Install geotextile fabric or aggregate in the excavated channel as a foundation for the riprap. Anchor fabric in accordance with design specifications.

As soon as the foundation is prepared, place the riprap to the thickness, depth and elevation shown in the design specifications. It should be a dense, uniform and well-graded mass with few voids.

Blend the finished rock surface with the surrounding land surface so there are no overfalls, channel constrictions or obstructions to flow.

### **Erosion Control**

Stabilize channel inlet points and install needed outlet protection prior to or during channel construction.

Stabilize disturbed areas after construction is completed.

### **Construction Verification**

Check finished grade and cross section of channel throughout the length of the watercourse. Verify channel cross sections at several locations to avoid flow constrictions.

### **Troubleshooting: Consult with registered design professional if the following occurs:**

- Variations in topography on site indicate channel will not function as intended; changes in plan may be needed.
- Design specifications for riprap sizing, filter fabric or aggregate filter cannot be met; substitution may be required. Unapproved substitutions could result in channel erosion.

### **Maintenance**

Inspect channels at regular intervals and after storm events.

When stones have been displaced, remove any debris and replace the stones in such a way as to not restrict the flow of water.

Give special attention to outlets and points where concentrated flow enters the channel, and repair eroded areas promptly.

Check for sediment accumulation, piping, bank instability and scour holes; repair promptly.

### **Common Problems**

Foundation excavation not deep enough or wide enough; may cause riprap to restrict channel flow and result in overflow and erosion—deepen channel and replace riprap.

Side slopes too steep; causes instability, rock material movement and bank failure—flatten side slopes.

Filter omitted or damaged during stone placement; may result in piping and bank instability—install filter and replace stone.

Riprap poorly graded or stones not placed to form a dense, stable channel lining; may result in rock displacement and erosion of the foundation—replace riprap with properly sized, well graded material.

Riprap installed smaller than specified; may result in rock displacement—selectively grouting over rock materials may stabilize the situation.

Riprap not extended far enough downstream; may result in undercutting—the channel should outlet on a stable location; extend riprap as needed.

Riprap not blended to ground surface; may result in gully along edge of riprap—regrade riprap to blend with ground surface.

Riprap not installed until after washout of other materials has occurred—replace eroded material and install riprap.

Riprap just dumped and not properly shaped; may result in rock displacement and erosion—repair eroded area and reshape riprap to attain proper channel shape.

## Sediment Fence

### Practice Description

A temporary sediment barrier consisting of a geotextile fabric which is attached to supporting posts and trenched into the ground. Sediment- laden runoff ponds uphill from the sediment fence and runoff is temporarily stored to allow sediment to settle out of the water. This practice applies where sheet erosion occurs on small disturbed areas. Sediment fences are intended to intercept and detain small amounts of sediment from disturbed areas in order to prevent sediment from leaving the site. Sediment fences can also prevent sheet erosion by decreasing the velocity of the runoff.



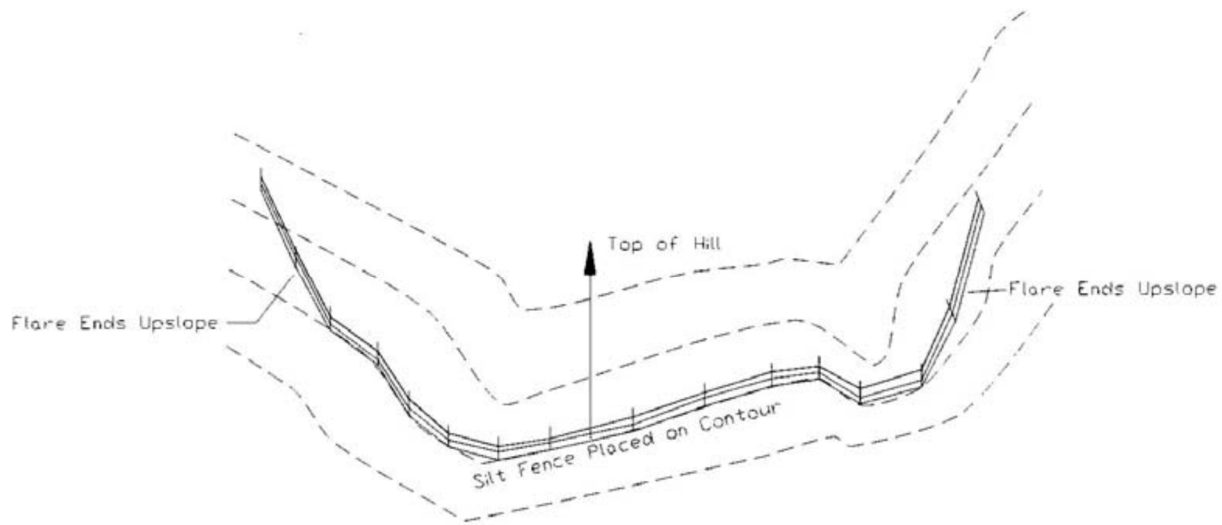
Prior to start of construction, sediment fences should be designed by a qualified professional. Plans and specifications should be referred to by field personnel throughout the construction process.

- **Drainage Area:** Limited to  $\frac{1}{4}$  acre per 100 feet of fence. Area is further restricted by slope steepness as shown in Table 5.16.
- **Location:** Fence should be built on a nearly level grade and at least 10 feet from the toe of the slope to provide a broad shallow sediment pool. Install on the contour, where fence can intercept runoff as a sheet flow; not located crossing channels, waterways or other concentrated flow paths; not attached to existing trees.
- **Length:** Maximum of 600 feet; flare ends of fence uphill to temporarily impound water as shown in Figure 5.33a.



Table 5.16 Typical Land Slope and Distance for Sediment Fence

Land Slope (%)	Maximum Slope Distance * above Fence (feet)
less than 2	100
2 to 5	75
5 to 10	50
greater than 10	*



\* Follow manufacturers' recommendations for proper spacing.

Figure 5.33a Placement of Sediment Fence

- **Spacing of Support Posts:** 10 feet maximum for fence supported by wire; 6 feet maximum for high strength fabric without supportive wire backing
- **Trench:** Bottom 1 foot of fence must be buried minimum of 6 inches deep.
- **Impounded Water Height:** Depth of impounded water should not exceed 1.5 feet at any point along the fence.
- **Support Posts:** 4-inch diameter wood or 1.33 lb/linear foot steel, buried or driven to a depth of 24 inches with support wire; 2-inch square wood or 1.0 lb/linear foot steel without support wire. Steel posts should have projections for fastening fabric.

Table 5.17 Example Specifications for Sediment Fence Fabric

Physical Property	Minimum Requirement
Filtering Efficiency	85%
Tensile strength at 20% (maximum) elongation:	
Standard strength	30 lb/linear inch
High strength	50 lb/linear inch

Source: Adapted from North Carolina Field Manual, 1991

- **Support Wire:** Wire fence (14-gauge with 6-inch mesh), necessary if standard strength fabric is used
- **Reinforced, Stabilized Outlets:** Should be located to limit water depth to 1.5 feet measured at lowest point along crest line.  
Crest Height: 1 foot maximum  
Width of splash pad: 5 feet maximum  
Length of splash pad: 5 feet minimum  
Supports: 4 foot spacing
- **Synthetic Geotextile Fabric:** Conforming to specifications in Table 5.17 and containing ultraviolet light inhibitors and stabilizers. **Minimum design life of 6 months.**

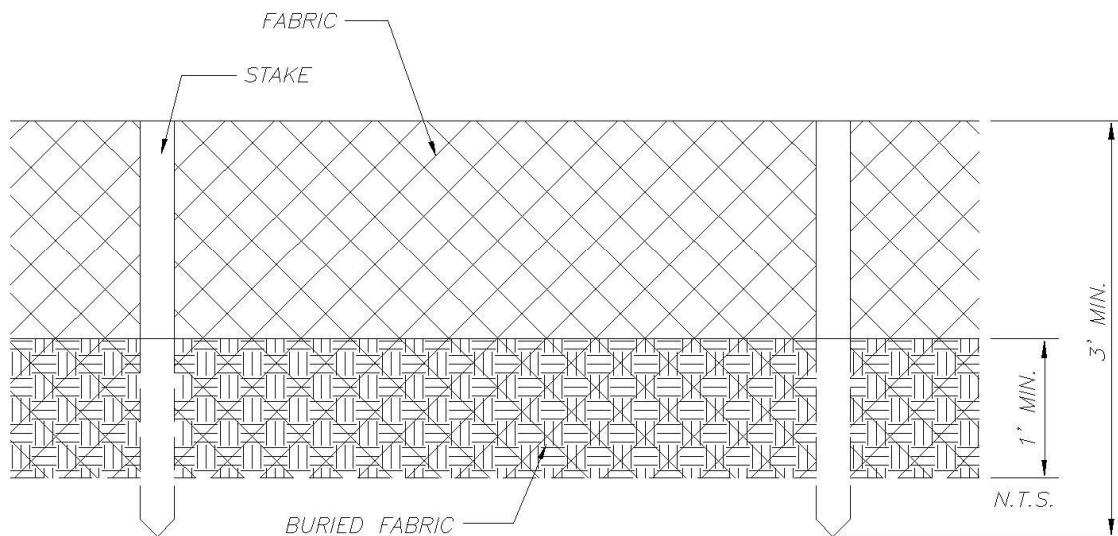


Figure 5.33 Installation of Sediment Fence

## Construction

### Site Preparation

Determine exact location of underground utilities. Grade alignment of fence as needed to provide broad, nearly level area upstream of fence.

### Fence Installation

Dig a trench at least 6 inches deep along the fence alignment as shown in Figure 5.34.

Drive posts at least 24 inches into the ground on the downslope side of the trench. Space posts a maximum of 10 feet if fence is supported by wire, or 6 feet if high strength fabric and no support fence is used.

Fasten support wire fence to upslope side of posts, extending 6 inches into the trench as shown in Fig. 5.33.

Attach continuous length of fabric to upslope side of fence posts. Try to minimize the number of joints. Avoid joints at low points in the fence line. Where joints are necessary, fasten fabric securely to support posts and overlap to the next post.

Place the bottom 1 foot of fabric in the 6-inch deep trench (minimum), lapping toward the upslope side. Backfill with compacted earth or gravel as shown in Figure 5.34.

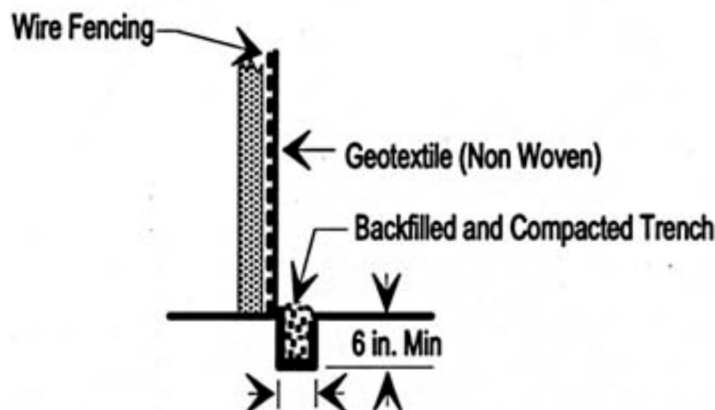


Figure 5.34 Detail of Sediment Fence Installation

To reduce maintenance, excavate a shallow sediment storage area in the upslope side of the fence. Provide good access in areas of heavy sedimentation for clean out and maintenance.

### Reinforced Stabilized Outlet Installation

Allow for safe bypass of storm flow to prevent overtopping failure of fence. Set outlet elevation so that water depth cannot exceed 1.5 feet at the lowest point along the fence. Drive posts securely at least 24 inches into the ground, at a spacing of 4 feet. Install a horizontal brace between the support posts to serve as an overflow weir and to support the top of the fabric. Immediately downslope of the fabric, excavate foundation for

splashpad a minimum of 5 feet wide, 5 feet long and 1 foot deep. Place 1 foot of riprap in the excavated foundation. The surface of the riprap should be flush with the undisturbed ground (no outfall).

### **Erosion Control**

Stabilize disturbed areas in accordance with vegetation plan.

### **Construction Verification**

Check finished grades and dimensions of the sediment fence. Check materials for compliance with specifications.

**Troubleshooting:** Consult with registered design professional if any of the following occur:

- Variations in topography on site indicate sediment fence will not function as intended; changes in plan may be needed.
- Design specifications for filter fabric, support posts, support fence, gravel or riprap cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

### **Maintenance**

Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment-fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid damaging or undermining the fence.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

### **Common Problems**

Drainage area too large or too much sediment accumulation allowed before cleanout; results in overtopping, sagging or collapse of fence. Increase sediment storage capacity upslope of fence or remove accumulation more frequently—repair fence.

Approach too steep; results in collapse of fence due to high velocity or undercutting of fence—reduce slope of approach area, or consult with registered design professional.

Fence not adequately supported; results in sagging or collapse of fence—add additional supports.

Bottom of fence not buried properly, results in undercutting of fence--reinstall fence using proper method of trenching.

Fence installed across drainageway; results in sagging, collapse or undercutting of fence—relocate fence away from drainageway.

**APPENDIX E**  
**MDNR PERMIT TERMINATION FORM**



**APPENDIX F**  
**RELEVANT PERMITS**

**APPENDIX G**  
**SWPPP AMENDMENTS**



**APPENDIX G  
SWPPP AMENDMENTS**

<b>Update</b>	<b>Date</b>

**APPENDIX H**  
**GRADING AND STABILIZATION LOG**

**APPENDIX H  
GRADING AND STABILIZATION LOG**

GRADING ACTIVITY OR STABILIZATION MEASURE	DATE STARTED/INSTALLED	DATE CEASED/REMOVED

**APPENDIX I**  
**SWPPP TRAINING LOG**

**APPENDIX I  
SWPPP TRAINING LOG**

TRAINING DESCRIPTION	DATE(S)	NAME(S) OF TRAINERS	NAME(S) OF TRAINEES

**\*SWPPP Training is not required; if training occurs it should be noted here.**

**APPENDIX J**  
**OWNER CERTIFICATION AND CONSULTANT DECLARATION**

**Owner's Certification:**

I hereby certify that I am the owner of the property described in this plan, or their legally authorized agent, and that I assume full responsibility for the performance of the operation stated in this plan.

Owner: Michael Trager  
By: Michael Trager  
Title: owner - operation plan Date: 02-23-2022

Owner's Signature: Michael Trager

**Consultant's Declaration:**

I hereby declare that the site plan, location map, and information contained in Sections 1 and 2 of this SWPPP has been prepared under my direction or supervision in accordance with Missouri Regulations, and applicable State and Federal Regulations and that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Consultant: Allstate Consultants LLC  
By: John Holmes  
Title: Project Engineer Date: 2/16/2022

Consultant's Signature: John Holmes